KINGSTON UNIVERSITY LONDON

"The Role of Institutional Entrepreneurs in Shaping the Renewable Energy Subfield in the UK during the Period 1986-2016"

By

Leigh St Aubyn CHAMPAGNIE

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ABSTRACT

Historically, energy systems have contributed significantly to global carbon emissions. To address this concern, countries such as the United Kingdom (UK) have embraced technologies such as renewable energy to try and reduce their carbon footprints. In the case of the UK, this led to the renewable energy subfield becoming partially institutionalised under the enabling role of actors, which suggests that this type of institutional change warrants being examined through the lens of institutional entrepreneurship theory. This doctoral thesis rises to the challenge by conducting institutional entrepreneurship research to investigate the institutionalisation of the renewable energy subfield in the UK during the period 1986-2016. Such an investigation is of social significance because the institutionalisation of the renewable energy subfield is likely to contribute to deinstitutionalising polluting technologies such as fossil fuels, thus contributing to the UK's transition to a low carbon economy.

The thesis is an exploratory, qualitative case study that combines thirty-nine semi-structured interviews of respondents connected to the field of energy provision in the UK with an analysis of archival documents. It finds that multiple actors practised as institutional entrepreneurs during the period, these being the state and its various agencies; renewable energy practitioners/activists; incumbent energy practitioners; the European Union and the United Nations. These institutional entrepreneurs played significant roles in shaping the renewable energy subfield by either creating new institutions and/or reforming existing ones, however, this had little impact on reshaping the field of energy provision in which it is embedded.

This thesis makes three major contributions to knowledge: (1) it proposes the construct of a subfield; (2) it shows that institutionalised structural myths may serve as enabling conditions; and (3) it offers partial institutionalisation as a novel account of the state of the renewable energy subfield in the UK. The idea of an organisational subfield contributes to knowledge by showing that this sub-community has its own unique features. For example, a subfield is embedded within an overarching organisational field, consequently, it is constrained by factors such as subordinacy and competing institutional logics. The thesis also shows that institutionalised structural myths, such as energy policy (un)certainty, (de)motivated some actors from practising as institutional entrepreneurs during the study period. The partial institutionalisation of the renewable energy subfield in the UK has caused it to be relatively vulnerable to any major environmental shocks it may face and less widely accepted than the fossil

fuels subfield. Being partially institutionalised also has three major implications: (1) business-as-usual for energy provision in the UK; (2) renewable energy deployment being patchy, and (3) most renewable energy practitioners remaining constrained as embedded agents. The conclusions of this thesis inform and deepen understanding of the role of actors' agency in facilitating or hindering the institutionalisation of renewable energy in the UK.

Keywords: Organisation field; renewable energy; renewable energy subfield; institutions; institutional entrepreneurs; institutional entrepreneurship; institutional change; partial institutionalisation; partial legitimacy.

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DECLARATION STATEMENT

STATEMENT 1

I hereby declare that this doctoral thesis is my own original work and has not been submitted elsewhere in fulfilment of the requirements of this or any other award.

Signed: Leigh St. Aubyn Champagnie

Date: February 17th, 2020

STATEMENT 2

I hereby declare that this thesis is the result of my own investigations, except where otherwise stated. I have not received any assistance, expect for that stated in the acknowledgements, whilst carrying out this research.

Signed: Leigh St. Aubyn Champagnie

Date: February 17th, 2020

DEDICATION

"*Our planet cannot be saved unless we leave fossil fuels in the ground where they belong. An upheaval and massive change is required, now. One that leads to a new collective consciousness. A new collective evolution of the human race, inspired and enabled by a sense of urgency from all of you.*

We all know that reversing the course of climate change will not be easy, but the tools are in our hands – if we apply them before it is too late.

Renewable energy, clean fuels, and putting a price on carbon pollution are beginning to turn the tide. This transition is not only the right thing for our world, but it also makes clear economic sense, and is possible within our lifetime".

Leonardo DiCaprio- Speaking at Earth Day 2016, the gathering of 170 nations to sign the historic 'Paris Agreement'.

"*If we find ways of generating and storing energy from renewable energy sources, then the problem of oil and coal will disappear*".

Sir David Attenborough- Responding during interview with Barack Obama 2016.

This thesis is dedicated to the responsible stewards of the natural environment, the inspirers of this thesis.

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The way in which the UK provides its energy is at a crossroad. It is at a juncture where it can either extend the gains made on the diffusion of its renewable energy assets or, back-pedal and stifle growth. It is against this backdrop, that I express my heartfelt gratitude to my research supervisors, Professor Audley Genus and Dr Marfuga Iskandarova, for preventing this philosophical worldview from clouding my objectivity during the undertaking of this doctoral thesis. Without their guidance, this thesis might not have yielded its unbiased, unfettered findings. I would also like to thank the other staff at Kingston University, especially Professor Blackburn, for his support during the commission of this research project. Professor Blackburn has not only steered the Small Business Research Centre along a path of conducting research which provides viable solutions for real-world problems, he has also kept the department firmly anchored to the moorings of undertaking scientific research of the highest credibility, validity and, integrity.

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I would also like to thank my wife Toni and daughters Leah and Tyla for their enduring patience during the undertaking of this research project. Finally, but probably most importantly, I would like to thank my mother Zetilda Champagnie for instilling in me the importance of higher education, otherwise, I might not have been sufficiently motivated to complete this doctoral thesis.

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LIST OF ABBREVIATIONS

AD	Anaerobic Digestion
ASHP	Air source Heat Pump
BEIS	Department for Business, Energy & Industrial Strategy
BERR	Department for Business, Enterprise and Regulatory Reform
BIS	Department for Business, Innovation and Skills
CCL	Climate Change Levy
CCS	Carbon Capture and Storage
CEO	Chief Executive Officer
CfD	Contracts for Difference
CH_4	Methane
CHP	Combine Heat and Power
CO_2	Carbon Dioxide
CP	Capacity Factor

CPA	Corporate Political Action
CPS	Carbon Price Support
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food & Rural Affairs
DNO	District Network Operator
DOE	Department of Energy
DTI	Department of Trade and Industry
EC	European Commission
ECS	Energy Crop Scheme
EDF	Électricité de France
EMEC	European Marine Energy Centre
EMR	Electricity Market Reform
EPA	Environmental Protection Agency
EU	European Union
EU ETS	European Union Emissions Trading Scheme
FCA	Financial Conduct Authority
FFL	Fossil Fuel Levy
FITs	Feed in Tariffs
FSA	Financial Services Authority

GDP	Gross Domestic Product
GEA	Green Energy Act
GNN	Government News Network
GW	Gigawatt
HCECCC	House of Commons Energy and Climate Change Committee
HFC	Hydrofluorocarbon
HMRC	Her Majesty's Revenue and Customs
IEA	International Energy Agency
IEPA	Independent Energy Producers Association of California
IGSHPAS	International Ground Source Heat Pump Association
IPPNY	Independent Power Producers of New York
IRENA	International Renewable Energy Agency
ISA	Individual Savings Accounts
ktoe	kilotonnes of oil equivalent
kW	Kilowatt
kWh	Kilowatt-hour
LCBP	Low Carbon Building Programme
LCPD	Large Combustion Plant Directive
LED	Light-emitting diode

LNG	Liquefied Natural Gas
MCS	Microgeneration Certification Scheme
MD	Managing Director
MW	Megawatt
MWh	Megawatt hour
N_2O	Nitrous Oxide
NEA	Netherland Enterprise Agency
NECD	National Emissions Ceilings Directive
NEF	National Energy Foundation
NETA	New Electricity Trading Arrangement
NFFO	Non-Fossil Fuel Obligation
NFPA	Non-Fossil Fuel Purchasing Agency
NIA	Nuclear Industry Association
NIMBYs	Not-In-My-Backyard Syndrome
Noaa	National Oceanic and Atmospheric Administration
NREAP	National Renewable Energy Action Plan
OFFER	Office of Electricity Regulation
Ofgas	Office of Gas Supply
Ofgem	Office of Gas and Electricity Markets

Ofwat	Water Services Regulation Authority
ONS	Office for National Statistics
OPEC	Organisation of Petroleum Exporting Countries
ORED	Office for Renewable Energy Deployment
OWC	Oscillating Water Column
PFCs	Perfluorocarbons
PPA	Power Purchase Agreement
PR	Public Relations
PV	Photovoltaic
RE	Renewable Energy
REA	Renewable Energy Association
RECC	Renewable Energy Consumer Code
RDPE	Rural Development Programme for England
RHI	Renewable Heat Incentive
ROCs	Renewable Obligation Certificates
RTFO	Renewable Transport Fuel Obligation
SEPA	Scottish Environmental Protection Agency
SF_6	Sulphur hexafluoride
SPV	Special Purpose Vehicle

STA	Solar Trade Association
TWh	Terawatt hours
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework on Climate Change
WEC	World Energy Council
WREN	World Renewable Energy Network

CHAPTER ONE

INTRODUCTION

1. INTRODUCTION

Changing energy systems at a national level is difficult to enact. The change envisaged by policymakers is elusive, or at best protracted, mainly because of deeply institutionalised norms (Scott, 2014; Meyer and Rowan, 1977). In the case of the UK, the need to accelerate the pace of institutional change of its energy system became apparent following the 1973 oil crisis; the liberalisation of the energy market (Pearson and Watson, 2012) and growing environmental concerns (*ibid*, 2012, p,14). These and other factors were influential in renewable energy entering the energy mix during the mid-nineteen eighties with an upsurge in solar energy installations and the introduction of initiatives such as the Southampton geothermal district heating scheme (Smith, 2000). In the three decades that followed, renewable energy has grown from accounting for less than 0.1% of the UK's energy in 1986 to more than 8.3% of final energy consumed[1] at the end of 2015 (BEIS, 2016a). This suggests that some form of institutional change had taken place (Zilber, 2008) in the UK's energy system. It is against this backdrop, that this doctoral thesis undertook institutional entrepreneurship research to investigate the institutionalisation of renewable energy in the UK, for the period 1986 to 2016.

Institutional entrepreneurship research lends itself to this inquiry because it examines the role of actors' agency in institutional change (DiMaggio, 1988). Referred to in this way, actors' agency means the conscious decision of individuals or organisations to try and provide alternative solutions ((Emirbayer and Mische, 1998) and their ability/capacity to do so. Undertaking institutional entrepreneurship research may therefore prove useful because it investigates how actors, referred to as institutional entrepreneurs (Hardy and Maguire, 2008), either dislodge such institutionalised norms (Scott, 2014; Fligstein, 1997; DiMaggio, 1988) or maintain the *status quo* (Greenwood and Suddaby, 2006). By so doing, the findings of this thesis contribute to informing policymakers, communities and businesses about how renewable energy can be institutionalised to support the UK's transformation from a high to a low-carbon economy, thus addressing the country's longstanding problem of fossil fuel dependency, a problem the next section elaborates upon.

[1] **Final energy consumed**: The total amount of energy consumed by all end-users (such as households and industry). Here, the term refers to the energy consumed by final end users, as opposed to primary energy consumption which is energy in its original state.

1.1 RATIONALE AND SIGNIFICANCE OF THE THESIS

The UK's dependency on fossil fuels is a cause for concern. With a population of 65,100,000 at the end of 2015 (ONS, 2017a) and growing, a vast amount of energy is consumed in the UK every year (DECC, 2015a). For instance, in 2015 the final energy consumed was 137,430 kilotonnes of oil equivalent (ktoe), an increase of 1.7 per cent on the previous year (BEIS, 2016a). This was mainly due to the increase in demand for natural gas and the growing transportation (40%); domestic (29%); industry (17%) and service (14%) sectors (*ibid*, 2016a, p.6). Since the transportation sector uses most of the energy consumed in the UK, it is not surprising that fossil fuels account for most of this (82%). Consequent to this, the oil and gas industry is very important to the UK economy, contributing some £35 billion to its GDP in 2015 and supported around 333,000 jobs during the same period (The UK Oil and Gas Industry Association, 2016). Despite its importance to the UK economy, fossil fuel usage has its ramifications (IEA, 2011). It has been empirically proven that when fossil fuels are used to generate energy they produce most of the carbon dioxide that causes climate change (DECC, 2009). Globally, at the end of 2015 this had escalated to 3.05 parts per million annually (Noaa, 2016). This has directly contributed to the UK consistently exceeding its annual acceptable air pollution limits (Environment Agency, 2016) and more broadly to climate change (IEA, 2011). The problem is further exacerbated by fossil fuels facing depletion (IEA, 2011) and the UK facing an energy gap of 55% by 2025 (Institution of Mechanical Engineers, 2016).

Faced with the global threat of fossil fuel dependency, it is now widely accepted that societies must transform to low-carbon economies (CCC, 2012). In the UK and elsewhere, it is perceived that renewable energy is one of the primary means by which this may be achieved (UNEP, 2011). Renewable energy is defined as "energy derived from natural processes (e.g. sunlight and wind) that are replenished at a higher rate than they are consumed" (IEA, 2017, p.1). It is comprised of several technologies, with the mainstream ones identified by the UK energy policy, NREAP, as wind, solar and hydro energy; bioenergy (energy from combustion of plant and animal matter; waste energy, such as landfill gas, and aerothermal, geothermal and hydrothermal energy (heat from the air, ground and water, respectively) (Parliament UK, 2019). Collectively, renewable energy technologies may therefore help countries transition from high to low-carbon societies because when they produce energy, they do not release harmful carbonic, sulphuric and nitric gases into the atmosphere (Pykh and

Pykh, 2002). This contrasts with fossil fuels which emit all those polluting compounds (Patt, 2015). These pollutants are a major cause for concern both globally and locally because they contribute to problems such as global warming; climate change; acid rain (*ibid*, 2015, p.18); and at a local level, health-related issues and environmental degradation (DEFRA, 2016).

To address these concerns, there is consensus across the European Union (EU) that each Member State must set individual targets for reducing their carbon footprints (DECC, 2009). In order to achieve this goal, the EU Renewable Energy Directive 2009 was launched in the UK to increase the amount of energy provided by renewable energy sources from 1.3 per cent in 2005 to 15 per cent by 2020 (DECC, 2011a). Similarly, the Climate Change Act 2008 was enacted to target the reduction of greenhouse gas emissions by at least 80 per cent by 2050, relative to 1990 levels (Cabinet Office, 2009). Although these institutions (Scott, 2014; Jepperson, 1991; Durkheim, 1964) may have been instrumental in increasing the penetration of renewable energy across the UK, prior to this thesis being undertaken, no empirical studies had investigated its institutionalisation. This represented a significant gap in knowledge because institutions are the stable, valued, recurring patterns of behaviour (Huntingdon, 1965) that bring order and stability to social life (Scott, 2001).

Past studies on renewable energy in the UK have focused on barriers to uptake (e.g. Sauter and Watson, 2007; Watson *et al*., 2006) and physical constraints (e.g. HCECCC, 2016; Anderson *et al*., 2001). These researches have also tended to investigate individual renewable energy technologies such as wind power (Mani and Tarun, 2013; Wiedmann *et al.*, 2011; Toke, 2011) and solar energy (e.g. Burnett *et al.*, 2014; Chapman, 1977), instead of renewable energy as a whole. This individualistic examination has resulted in an incomplete picture being painted of how renewable energy has holistically evolved in the UK over the past three decades and the role of actors' agency in bringing about that change.

The few studies which have conducted institutional entrepreneurship research to investigate the institutionalisation of renewable energy in other empirical settings have similarly failed to conduct comprehensive inquiries which fully examine the relationship between actors and process in enacting institutional change. By so doing, these studies have focused on certain facets of the process of institutional entrepreneurship, instead of comprehensively analysing how institutional entrepreneurs shaped institutions to enact institutional change; the qualities they

possessed to do so; the role of power and agency in the process; the enabling conditions which facilitated this; the mechanisms they employed to initiate change and how they gained legitimacy for themselves and their activities. For example, Jolly and Raven (2015) focused on collective institutional entrepreneurship; Xiangli (2008) primarily on the strategic actions taken by institutional entrepreneurs; Smink *et al.* (2015) on the difference between the activities of incumbents and new entrants; Walker *et al.* (2014) on organisational ingenuity and Sarasini (2013) on corporate political action (CPA). The literature review conducted by this thesis has however concluded that the various aspects of institutional entrepreneurship are so intertwined that a holistic approach must be taken to conduct a comprehensive inquiry. That is because institutional entrepreneurship is a complex process which involves the activities of actors who have an interest in particular institutional arrangements and leverage resources to create new institutions or transform existing ones (Rao, Morrill, & Zald, 2000; Fligstein, 1997; DiMaggio, 1988).

This thesis emerged from the realisation that although institutional entrepreneurs may have played a pivotal role in the institutionalisation (Dacin and Dacin, 2008; Jepperson, 1991) of renewable energy in the UK, the phenomenon had remained unexplored. This represented a gap in knowledge because organisational fields, such as the field of energy provision and its renewable energy subfield, are constructed of institutions and the primary activity of institutional entrepreneurs is to shape or reform them (DiMaggio, 1988). Examining how institutional entrepreneurs may have disrupted existing institutional arrangements within the field of energy provision to make renewable energy a growing part of the UK's energy mix therefore provides fresh insights on a previously undocumented account of institutional change. This is important because institutions are the mechanisms which either bring stability or instability to social settings such as the organisational field of energy provision (Scott, 2014). In other words, institutions are the rules of the game (North, 1990). It therefore follows that institutional entrepreneurs are rule makers, rather than rule takers (Child *et al.*, 2007).

Since institutions are the rules of the game (Jepperson, 1991; North, 1990), renewable energy practitioners must de-institutionalise existing ones and institutionalise those they are proposing (Greenwood *et al.*, 2002) to achieve their vested interests (DiMaggio, 1988). This involves a process of disrupting existing beliefs, norms and practices, delegitimising or disusing existing institutions and

replacing them with new rules, scripts and forms (Scott, 2014). Despite this efficacy, past research has focused on the pragmatic factors which influence the deployment of renewable energy, instead of the less obvious but farther-reaching effects of being institutionalised (Jepperson, 1991). This is a significant shortcoming because studies conducted elsewhere (e.g. Walker *et al.* 2014; Jolly and Raven, 2015) have shown that institutional entrepreneurs (Hardy and Maguire, 2008; DiMaggio, 1988) have reconfigured prevailing institutional arrangements to shape the renewable energy subfields in those empirical settings. Used in this way, the term subfield is a construct proposed by this thesis to mean a sub-community within an organisational field and is the sociological equivalent to the terms "renewable energy sector" (e.g. DECC, 2011); "renewable energy industry" (e.g. Xiangli, 2008); and the "emerging renewable energy field" (e.g. Smink *et al*, 2015).

Researchers have also conducted institutional entrepreneurship research in other organisational fields and found that institutional entrepreneurs were equally effective in changing deeply institutionalised norms and practices in those settings. For example, Greenwood and Suddaby (2006) examined the accounting industry in Canada found that institutional entrepreneurs deinstitutionalised deeply embedded norms to redefine the convention for accounting within that organisational field. Maguire *et al*., (2004) also established that institutional entrepreneurs created new institutions to shape the emerging field of HIV/AIDS treatment advocacy within that same country. Given this, the renewable energy subfield in the UK provided a unique opportunity to extend existing theory by examining a salient case of institutional entrepreneurs shaping institutional arrangements within that organisational subfield to try and reshape the field of energy provision in which it is embedded.

This study may prove useful by contributing to the unexplored area of research related to the practice of institutional entrepreneurship in the renewable energy subfield in the UK and posing pertinent questions to guide future research. Its main significance is the fresh insights it provides on the role institutional entrepreneurs may have played, and can play, in increasing the penetration of renewable energy across the UK. Unlike basic research which seeks to understand fundamental principles (National Science Foundation, 1953), this thesis conducted an applied exploratory study that examined the real-world issue (Brodsky and Welsh, 2008) of the extent of the institutionalisation of renewable energy subfield in the UK. Taking this approach therefore facilitates a better understanding of the less obvious, backstage stage

activities which have influenced the deployment of renewable energy in the UK, instead of the usual front stage explanations provided for the phenomenon. In order to make progress with this, the next section gets to the root of the problem.

1.2 PROBLEM STATEMENT: THE INSTITUTIONALISED CONSTRAINT OF ENERGY PROVISION IN THE UK

The UK has been long constrained by having to provide clean, reliable energy, while not adversely damaging its natural ecosystem. The "energy trilemma", so to speak (WEC, 2016). As established in the preceding section, this has proven to be challenging because the UK still provides most of its energy from fossil fuels (BEIS, 2016a). The use of such vast quantities of hydrocarbon fuels is detrimental for three main reasons. First, fossil fuels are non-renewable energy resources which will eventually run out (IEA, 2011). Second, when fossil fuels are burnt they release carbon dioxide and sulphur dioxide, the main causes of climate change and inner-city air pollution respectively (DECC, 2009). Third, the UK is a net importer of hydrocarbon fuels, which suggests it is energy insecure (BEIS, 2016a).

The UK's dependency on fossil fuels is deeply entrenched. Historically, the country has relied heavily on coal, oil and natural gas for its energy provision, with these being the main technologies used since the first Industrial Revolution (Pearson and Watson, 2012). This dependency is so permanent, widespread and taken-for-granted it is institutionalised (Jepperson, 1991; Meyer and Rowan, 1977). Entities which are institutionalised can have the significant problems of being enduring; normalised and self-reproducing (Scott, 2014; DiMaggio and Powell, 1983; Zucker, 1977). In other words, because fossil fuel usage is institutionalised, it is subconsciously consumed by the public and some energy providers in a taken-for-granted way (Suchman, 1995).

Many institutional analysts (e.g.; Hardy and Maguire, 2008; Leca *et al.*, 2008; Garud *et al.,* 2007; DiMaggio, 1988) believe that institutional entrepreneurship theory is appropriate for investigating how institutional entrepreneurs skilfully attempt to uproot such deep-seated institutionalised norms to achieve interests they value highly. Despite this centrality, the review of the literature indicates that the institutionalisation of renewable energy in the UK had not been previously examined through the lens of institutional entrepreneurship theory. This represented a significant gap in knowledge because studies conducted elsewhere (see section 1.1) have shown that institutional

entrepreneurs have been instrumental in changing the *status quo* in their empirical settings. This study aimed to fill that gap by exploring how the renewable energy subfield in the UK might have been shaped by institutional entrepreneurs (Hardy and Maguire, 2008) during the period 1986-2016 and what effect this may have had on the field of energy provision. In order to achieve this, the thesis has the aims, objectives and research questions set out in the next section.

1.3 AIM, RESEARCH QUESTIONS AND OBJECTIVES OF THE THESIS

The aim of this thesis was to explore what role institutional entrepreneurs may have played in shaping the renewable energy subfield in the UK during the period 1986-2016, and what effect this may have had on the field of energy provision in which it is embedded. In order to achieve this, the thesis had three main objectives:

1. To examine the renewable energy subfield in the UK for the period 1986-2016 to ascertain if institutional entrepreneurship had indeed occurred within that organisational subfield and what effect this might have had on the field of energy provision.
2. To explore the enabling conditions which may have influenced actors to try and redefine the way energy is provided in the UK.
3. To identify the actors who might have acted as institutional entrepreneurs in the renewable energy subfield and how they may have gained legitimacy for themselves and their activities in relation to the provision of energy in the UK.

In an attempt at meeting these objectives, the thesis first conducted a literature review to gain an understanding of existing theory relevant to the thesis topic and identify any gaps in knowledge. The literature review established that institutional entrepreneurs are generally motivated to change existing institutional arrangements in organisational fields to realise interests they value highly (Maguire *et al.*, 2004; DiMaggio, 1988). This can be particularly challenging in highly institutionalised fields, such as the field of energy provision, because dominant players (Maguire *et al.*, 2004); competing institutional logics (Thornton and Ocasio, 2008); institutional constraints (Walker *et al.*, 2014; Scott, 2008a; Seo and Creed, 2002) and negative collective cognition may serve as barriers to field-level institutional change (Scott, 2004). As mentioned above, the renewable energy subfield is embedded within the more highly institutionalised field of energy provision. It is therefore in the interest of institutional entrepreneurs to shape the comparatively newer subfield to suit their vested interests as this has the

potential of reshaping the of energy provision (Maguire *et al.*, 2004). This led to the formulation of the first broad research question:

1. *"What role have institutional entrepreneurs played in shaping the renewable energy subfield in the UK during the period 1986-2016 and what impact might this have had on the field of energy provision?"*

To shape the renewable energy subfield, it is essential that there are the right enabling conditions[2] (Battilana *et al.*, 2009; Child *et al.*, 2007). Enabling conditions are important because they facilitate the creation of the rules required to support institutions; continue institutional routines and ensure institutional survival (Lawrence and Suddaby, 2006). This influenced the design of the second research question:

2. *"What conditions facilitated or hampered the shaping of the renewable energy subfield during the period?"*

Even though institutional entrepreneurs may be partly successful in shaping some of the norms and practices in the renewable energy subfield, there is no guarantee that they will gain acceptance for themselves and their activities (Battilana *et al*., 2009; Child *et al.*, 2007). They must gain legitimacy[3] (Suchman, 1995). Legitimacy is central to the process of institutional entrepreneurship because it provides the social acceptance institutional entrepreneurs need to survive and thrive in the highly institutionalised field (Maguire *et al.*, 2004) of energy provision. This is particularly so in the case of the renewable energy subfield in the UK because it is a relatively new area of activity whose track-record is yet to be proven (Stinchcombe, 1965). This informed the conception of the third broad research question:

3. *"How might have the institutional entrepreneurs gained legitimacy for themselves and their activities and what effect did this have on renewable energy, and the renewable energy subfield as a whole, in gaining legitimacy?"*

To answer the preceding broad research questions, the thesis utilised the methodology outlined in the next section.

[2] Enabling conditions- The factors and/or conditions which serve as antecedents to institutional entrepreneurship (Battilana *et al.*, 2009).

[3] Legitimacy- The widespread assumption or perception that the actions of an entity are proper, desirable, or appropriate within a socially constructed system of beliefs, norms, values and definitions (Suchman, 1995).

1.4 OVERVIEW OF RESEARCH METHODOLOGY

This thesis emerged from a three-year exploratory qualitative case study research which collected empirical data related to the institutionalisation of renewable energy in the UK during the period 1986-2016. An exploratory qualitative case study research was perceived by the author as being an appropriate approach for conducting the inquiry because it generates theory about previously unexplored phenomena (Bryman and Bell, 2011). In order to generate theory, this thesis used existing scholarship on institutional entrepreneurship theory to interpret its findings to see if they corroborate or contrast with these prevailing ideas (Coffey and Atkinson, 1996). This was particularly pertinent because there was a lack of existing scholarship (Stebbins, 2001) on the institutionalisation of renewable energy in the empirical setting of the UK during the period. Qualitative research is a naturalistic form of inquiry which fits well with institutional entrepreneurship theory (Greenwood and Suddaby, 2006), the branch of institutional theory that subjectively analyses the relationship between institutional structures and actors' agency (Garud *et al*., 2007; DiMaggio, 1988). Conducting a qualitative study was appropriate for examining the process of institutional entrepreneurship because it undertakes rich, detailed, interpretivist analysis that takes into account the institutional context[4] (Maguire *et al.,* 2004; Garud *et al*., 2002). Studying the institutionalisation of renewable energy from an interpretivist ontological position also allowed for understanding and interpreting the contradictions (Kvale, 2007) associated with the complex field of energy provision in which causal dynamics are not immediately apparent and the motivations of actors are obscure. For that reason, the goal of this approach was not to test theory, but to make trustworthy interpretations about the informants' subjective views (Creswell, 2013; Bryman and Bell, 2011).

This thesis initially analysed secondary data over a one-year period to determine what work had already been done on renewable energy in the setting of the UK and to devise a suitable theoretical framework for conducting the inquiry. This was followed by the concurrent analysis of state documents and semi-structured interviews over a two-year period in which participants were asked to provide historical accounts of their experiences and matters pertaining to renewable energy in

[4] Institutional context: The system of rules, practises, norms and culture which characterise an institutional environment.

the UK for the study period (1986-2016). As with the other philosophical positions, the data analysis also followed the interpretivist tradition using hermeneutics (Gray, 2014) whereby principles from institutional entrepreneurship theory were used as sensitizing devices to support the coding, analysis and interpretation of the data. Since a subjectivist epistemological position was assumed for this thesis, all explanations made about the collected data are subjective and differ from participant to participant (Merriam, 2009). Bloomberg and Volpe's (2008) outline tool was used to assist in determining how the findings related to the research questions, thus shedding light on how the institutionalisation of renewable energy can address the social issues described in section 1.1. Although using an exploratory qualitative approach provides fresh insights on the institutionalisation of renewable energy in the UK, this thesis is limited in scope, as the next section explains.

1.5 SCOPE AND DELIMITATION

This section describes the scope and choices made for the thesis. This is important because the limitations of research are the boundaries set by the researcher and the choices they have made (Jensen, 2008). As the literature review established, the use of renewable energy in the UK is not new. Early accounts date to the use of wood for fire during the Hoxnian period (Preece, 2006) and wind power providing about 2% of national power demands during the 1700s (Jones and Bouamane, 2011). This thesis does not cover those early periods. Instead, it focuses on the period 1986-2016 because renewable energy had grown from providing less than 0.1% of final energy consumed in the UK in 1986 to 8.3% in 2015 (BEIS, 2016a). As such, this presented a case of institutional change that is of such currency it warranted being investigated.

The geographical setting for this thesis is the UK. This includes the Member States of England; Northern Ireland; Scotland and Wales. For this reason, some of the findings of this study are applicable to this geographical region only because of aspects which are unique to this location. For example, national energy policies; national and subnational politics; size; population; renewable energy resources and so forth. On the other hand, some findings are generalisable to organisational field theory because this thesis examined the organisational field of energy provision in the UK. This is mainly because organisational fields are geographically unbounded areas (Wooten and Hoffman, 2008; Scott, 1991), subjectively created by their constituents, who interact more fatefully with each other than those outside the field (DiMaggio, 1991). Due to

this duality, a clear distinction is made between the applicability of both sets of findings in the discussion and conclusion sections of this thesis. Relatedly, this thesis considered all the major renewable energy technologies collectively, unlike some scholars who focused on individual segments.

This thesis examined a case of institutional change within the renewable energy subfield in the UK through the lens of institutional entrepreneurship theory. By so doing, it investigated how some actors might have practised as institutional entrepreneurs by wittingly creating and/or changing institutions within that organisational subfield (DiMaggio, 1988). Institutional entrepreneurship theory is however only one of many branches of institutional theory, the overarching approach which seeks to understand how structures such norms; rules; routines and schemes, become established guidelines for social behaviour (Scott, 2014). There are two related but distinct branches of institutional theory, old institutionalism and neo-institutionalism. While old institutionalism proposes a model of rational behaviour and path dependency (Garud *et al.*, 2007; Selznick, 1948), neo-institutionalism seeks to provide cognitive and cultural explanations of organisational and social phenomena (DiMaggio and Powell, 1991). The central belief of neo, or new-institutionalism, is that institutions operate in open environments which consist of other institutions (*ibid*, 1991, p.12). Within these communities called organisational fields, every institution is influenced by the broader environment and the main goal of organisations is to survive and gain legitimacy (Scott, 2001). In order to gain legitimacy, organisations need to be more than economically successful, they must be accepted in the organisational field (Suchman, 1995; DiMaggio and Powell, 1991). This thesis draws on institutional entrepreneurship theory, a branch of neo-intuitionalism, for its underlying theoretical perspective (Garud *et al.*, 2007).

Two of the central units of analysis for this thesis are the renewable energy subfield and the organisational field of energy provision. During the investigation of the renewable energy subfield, all its sub-communities are examined impartially, however, because the subfield is subjectively constructed by its constituents, the amount of attention given to each technology is proportional to what the collected data reveal. That is, some technologies may be more frequently referred to than others in the findings and discussion. The "mainstream" technologies which belong to the renewable energy subfield are detailed in chapter four. In the context of this thesis, the term organisational field refers to the constellation of actors which operate within that

specific area (Hardy and Maguire, 2008), and has been otherwise referred to by researchers as societal sector (Scott and Meyer, 1991); institutional environment (e.g. Powell, 1991); institutional sphere (e.g. Fligstein, 1990) and institutional field (e.g. Meyer and Rowan, 1977).

The population of this thesis are actors and objects belonging to the organisational field of energy provision in the UK. For qualification, the population of a scientific query is the entire collection of individuals and objects that it focuses on (Marshall and Rossman, 2006). Since organisational fields are relational networks subjectively created by their constituents who interact fatefully with each other (DiMaggio, 1991), it would have been virtually impossible to provide an exhaustive list of the population of this thesis. However, interviewees were recruited from the various subfields in the field of energy provision through snowball and purposive sampling. Since purposive sampling was the main technique used to recruit the participants, the majority of informants were recruited from the renewable energy subfield because they were most consistent with the research design (Jensen, 2008. This approach was also taken because it enhances the potential of readers accessing the degree of transferability to their given context (*ibid,* 2008, p.886). The next section provides a clearer indication of the full scope of this thesis.

1.6 STRUCTURE OF THE THESIS

The thesis has seven chapters. This introducing chapter provides an overview of the research. It aims to inform the reader on what was studied, why it was researched; the aim and objectives of the thesis; the broad research questions that guided the study; the social significance of the research and an overview of the methods used to collect, analyse and interpret the empirical data.

Chapter Two reviews literature pertaining to institutional entrepreneurship theory and renewable energy which are of particular relevance to this thesis. It also identifies the gaps in knowledge and outlines the theoretical framework of the study. As mentioned in section 1.5, very few scholars have employed institutional entrepreneurship theory to investigate renewable energy. This made it difficult to develop a suitable theoretical framework to inform the study and enlighten readers about how institutional entrepreneurship may be associated with the institutionalisation of technologies such as renewable energy and other practices. For that reason, the chapter is divided into two sections. The first section synthesises some

of the key conceptual literature pertaining to institutional entrepreneurship theory and institutions. For example, the seminal works of DiMaggio (1988), one of the founders of the sub-discipline of institutional entrepreneurship theory. The second section critically reviews the empirical studies which have utilised institutional entrepreneurship research to conduct their inquiries.

Chapter Three situates the study within its methodological tradition; provides the rationale for doing so; describes data collection, analysis and interpretation methods; and explains how ethical issues are addressed. In this chapter, the philosophical assumptions which underlie the research are discussed. Here, it is explained that an interpretivist philosophical perspective has been assumed for this thesis because of the lack of scholarly work on the research topic and this approach lends itself to investigating such underexplored phenomena (Stebbins, 2001).

Chapter Four describes the research setting and context for the thesis. It aims to contextualise the thesis by using the findings of the document analysis to describe unique features of the UK (e.g. geography; population; energy use; renewable energy resources; energy policy; etc.) which may have contributed to or hindered the institutionalisation of renewable energy. It also provides further justification of why institutional entrepreneurship should have been studied in relation to the renewable energy subfield in the UK by providing preliminary evidence of institutional change within that subfield (e.g. statistical data). Since it is recognised by the present author that some of the information provided by the informants lack precision (e.g. specific dates; inaccurate and/or lack of identification of actors; etc.) this chapter anchors some of their accounts to more precise data (e.g. dates; quantities; actors; etc.) documented by credible organisations such as the Office for National Statistics (ONS).

Chapter Five presents the findings of the primary data. It provides the first-hand information needed to answer the research questions posed and is the foundation of the chapters that follow.

Chapter Six analyses and discusses what the findings mean in light of the research questions, literature review and conceptual framework. It discusses the role of institutional entrepreneurs in shaping the renewable energy subfield and the impact this had on the field of energy provision. In so doing, the chapter answers the first research question by discussing how institutional entrepreneurs might have shaped the renewable energy subfield in the UK during the period 1986-2016 and the impact this may have had on the overarching field of energy provision. It also answers the second

and third research questions by discussing the enabling conditions which facilitated the shaping of the renewable energy subfield and explains how institutional entrepreneurs; their activities and the renewable energy subfield as a whole might have gained legitimacy.

Chapter Seven closes the thesis by presenting a set of concluding statements. It recaps what the research had set out to do; presents the findings and briefly discusses how they relate to previous work in the area. The chapter provides the implications of the thesis based on the knowledge gained from the research and briefly discusses their potential impacts on society and the economy. It communicates the key contributions of the thesis and shows the results of a substantial and sustained effort to investigate a socially significant topic that is relevant to theory, research and practice. To be prudent, the chapter also discusses the limitations of the research which constrained the interpretations of the findings.

1.7 SUMMARY

This chapter has introduced the thesis. It began by arguing that although it is desirable to transform energy systems globally because they are unsustainable and polluting, institutionalised norms and practices makes it difficult to do so. Despite those institutionalised practices, the renewable energy subfield in the UK has grown from providing less than 0.1% of the final energy consumed in 1986, to more than 8.3% in 2015. Although this suggests that some form of institutional change had occurred under the enabling role of actors during the period, past research had not examined this process from the perspective of actors' agency in its transition. Mainly due to this reason, the chapter proposes institutional entrepreneurship research as a suitable analytical framework for closing that gap because it examines the role of actors' agency in institutional change.

The subsequent section presented the aim, research questions and objectives of the thesis. Here, it disclosed that the aim of the thesis was to explore how the renewable energy subfield in the UK had been shaped during the period 1986-2016 and what effect this might have had on the field of energy provision. In order to achieve this, the thesis posed three broad research questions. These questions are based on the fundamental principles of institutional entrepreneurship theory, which proposes that institutional entrepreneurship occurs in organisational fields. Enabling conditions within the field motivate actors to try and change or reform existing institutional

arrangements in order to achieve interests they value highly. These actors are referred to as institutional entrepreneurs. In order to gain acceptance for themselves and their activities, institutional entrepreneurs must gain legitimacy.

The section that followed outlined the methodology used to answer the research questions. It explained that the thesis conducted an exploratory qualitative case study research because the topic had not been previously explored. The subsequent section sets out the scope of the thesis, where it states that the thesis focused on examining the renewable energy subfield in the UK for the period 1986-2016 because some form of institutional change had occurred under the enabling role of institutional entrepreneurs during that period. For that reason, the target population for the thesis comprised mainly actors belonging to the renewable energy subfield in the UK because they are consistent with the research design. The chapter concludes by describing the structure of the thesis, during which it states that the thesis has seven chapters, with the next being the literature review.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews relevant literature pertaining to the research topic: "Institutional Entrepreneurship in the Renewable Energy Subfield in the UK during the Period 1986 to 2016". Its main aim is to critically review the literature that serves as the foundation for this thesis. It does not profess to review all that has been written on the subject, instead, it criticises existing literature on the research topic that requires a doctoral study to be undertaken. The chapter also constructs a theoretical framework that positions this thesis in the context of work previously undertaken and identifies the gaps in knowledge which led to the formulation of the research questions. As the next section reveals, the literature search found that very little scholarly work had previously been done on the research topic. For this reason, the first part of the chapter focuses on providing a theoretical background of considerable depth to assist the reader in understanding some of the fundamental principles which underlie institutional entrepreneurship theory, primarily because the recent empirical studies have sparsely attended to this.

The chapter has seven sections. Following the introduction, section 2.2 describes the strategy used to search for relevant publications on the thesis topic. Section 2.3 places the thesis in its historical context by positioning institutional entrepreneurship within the overarching academic field of institutional theory. It also informs readers about the main principles of institutional entrepreneurship theory, the theoretical posture adopted by this thesis. Section 2.4 reviews recent empirical studies on institutional entrepreneurship in the renewable energy subfield in general. Having reviewed the recent empirical studies, section 2.5 identifies the gap in knowledge. Section 2.6 proposes a theoretical framework for investigating institutional entrepreneurship in the renewable energy subfield in the UK. Section 2.7 summarises the more salient findings of the literature review.

2.2 SEARCH STRATEGY

An exploratory literature search was conducted for this thesis. It was performed between 3rd May and 15th June 2015, using Kingston University's online library resource iCat. This resource was interrogated because it combines the repositories of many of the major peer-reviewed journal databases and other suitable texts. The aim of the search was to identify documents meeting the following inclusion criteria: articles including renewable energy, institutional entrepreneurship and microgeneration published in English for all years.

Documents were included if they were peer-reviewed and deemed acceptable for informing academia. Articles were limited to those which conducted scientific inquiries and includes conference proceedings. Documents were excluded if they were not peer-reviewed, informal literature surveys (e.g. no search or data analysis processes disclosed), news announcements and editorials on general social science education. The term microgeneration was included as one of the parameters because initial searches had revealed that previous studies on renewable energy in the UK have tended to focus on the microgeneration segment of the field. The decision was made to specify the search period to include "all years" because the key principles underlying the practice of institutional entrepreneurship were formally conceived by DiMaggio in 1988, which is not a too distant past. Further, although at a doctoral level it is common practise to include documents published on studies conducted within the past ten years (Petticrew and Roberts, 2006), "all years" was the parameter because it was envisaged that conducting a search to encompass a thirty-year period would generate a manageable amount of data.

A total of eight (8) documents met the criteria for inclusion in the review of recent empirical studies on institutional entrepreneurship in the renewable energy subfield. Of these, only six (6) were specific to the broader renewable energy subfield, while the other two focused on the microgeneration sub-community. None of these studies examined the process of institutional entrepreneurship in the renewable energy subfield in the UK. The eight empirical studies have been reviewed and summarised in Table 2 presented in section 2.4.2 of this chapter. The review of the empirical studies found that these researchers had not attended to some of the fundamental principles of institutional entrepreneurship theory and this had the consequence of many important aspects of the process of institutional entrepreneurship being absent from their inquiries. In order to address this concern, the literature search was broadened to find other publications which provided sufficient information to formulate a suitable theoretical base for guiding the thesis.

The literature search was broadened by conducting further online searches on the 23rd September 2015, again using Kingston University's library resource iCat. The aim of this extended search was not only to formulate a suitable theoretical framework for the thesis, but also to serve as a point of reference for identifying important aspects of

institutional entrepreneurship theory which may have not been considered by the recent empirical works, thus being able to identify the gaps in knowledge. In order to conduct the search, relevant documents were identified by setting the following inclusion criteria: articles including institutional entrepreneurship "and" "or" institutional entrepreneur published in English for all years. Documents were included if they were peer-reviewed and deemed acceptable for informing academia. Articles were limited to those which conducted scientific inquiries and includes conference proceedings. The search generated 17,333 articles. The majority of these publications (over 17,200) were however generated because they contained the words "institutional"; "entrepreneur" and "entrepreneurship", rather than the entire search term combined. Given this, these documents (book reviews, call for papers, editorials, journal articles) were all excluded from the pool. Documents were also excluded if they were not peer-reviewed, informal literature surveys (e.g. no search or data analysis processes disclosed), news announcements and editorials on general social science education. This left 42 articles in total which focused directly on "institutional entrepreneurs" and/or "institutional entrepreneurship", with the majority of articles being published in the Energy Policy journal, the Journal of Cleaner Production, the Journal of Business Venturing, the Research Policy journal. An interesting observation of these publications was the variety of fields in which institutional entrepreneurship research has been conducted, ranging from the organisational field of accountancy (Greenwood and Suddaby, 2006) to gastronomy (Rao *et al.*, 2003). Another notable observation was the substantial amount of studies which had been conducted within the ten years preceding the literature search, which suggests that the process of institutional entrepreneurship research has been generating considerable interest in recent years.

During the literature search, twenty seminal works, published as book chapters, were identified and subsequently reviewed. These are the works of Battilana and Leca, 2008; Dacin and Dacin, 2008; Deephouse and Suchman, 2008; Hardy and Maguire, 2008; Lawrence, 2008; Meyer, 2008; Thornton and Ocasio, 2008; Wooten and Hoffman, 2008; Zilber, 2008; Hwang and Powell, 2005; DiMaggio, 1988, 1991, DiMaggio and Powell, 1991; Fligstein, 1991; Jepperson, 1991; Meyer and Rowan, 1991; Powell, 1991; Scott, 1991; Scott and Meyer, 1991 and Zucker, 1991. A review of this latter pool of publications provided sufficient information to formulate a suitable theoretical framework for

informing the thesis, as the section that follows demonstrates. However, since the gaps in knowledge are identified through the review of recent empirical studies which have been conducted in the renewable energy subfield, this latter pool of publications is not summarised in a tabulated format as the recent empirical studies are. The section that follows is mainly informed by the information obtained from these publications and other relevant seminal works.

2.3 THEORETICAL ORIENTATION

This section reviews relevant background literature pertaining to institutional entrepreneurship theory. When necessary, it also considers institutional theory because institutional entrepreneurship theory falls within this academic field. This section does not review recent empirical institutional entrepreneurship research on renewable energy, that task is left for the section that follows. As pointed out in the introduction, very little institutional entrepreneurship research has been carried out on renewable energy, and the few studies which have been conducted, have not adequately attended to some of its core principles (hence the gaps in knowledge). In the absence of such information, the purpose of this section is to position institutional entrepreneurship theory in its overarching academic field of institutional theory and provide the theoretical base necessary for evaluating whether or not the recent empirical studies were conducted in the context of prior scholarship.

2.3.1 Institutional Entrepreneurship: Theoretical Origin and Core Principles

The central background knowledge that informs this thesis is institutional entrepreneurship theory (DiMaggio, 1988). This theoretical posture is a branch of institutional theory, an overarching approach that studies formal and informal institutions (DiMaggio and Powell, 1991). Due to this intertwinement, this thesis is not solely informed by a single school of thought but relies instead on the main ideas concerning institutions; institutional theory and institutional entrepreneurship theory. Given this (and the dearth of empirical studies which previously investigated institutional entrepreneurship in the renewable energy subfield), the historical affiliation of these principles is now traced to broaden one's understanding of the main theoretical ideas and assumptions which underlie this thesis.

Institutional theory focuses on the stability and change of institutions (Scott, 2001). Theoretically, it considers the processes by which structures such as rules, routines, norms and schemes become established as authoritative guidelines for social behaviour (Scott, 2004). It offers a powerful approach for analysing institutional change because it focuses on the more resilient aspects of social order (Scott, 2008). Institutional theory is also particularly useful for understanding the complexities associated with the process of institutional entrepreneurship because it emphasises rational myths and provides an understanding of how organisational entities gain legitimacy (*ibid,* 2008, p.429). This approach however has two distinctive branches, old institutionalism and neo-institutionalism (DiMaggio and Powell, 1991).

The conceptual foundations of old institutionalism can be traced to the works of Veblen (1899); Weber (1922); Commons (1934); Parsons (1937) and Durkheim (1947; 1964). Collectively these contributors used institutions to determine the sequences of social, economic, political behaviour and change over time (Hinings and Tolbert, 2008), offering a model of rational behaviour and path dependency (Garud *et al.*, 2007). In such a situation, organisations become isomorphic[5] (DiMaggio and Powell, 1983) within their institutional context in order to gain legitimacy (Greenwood *et al.,* 2008). Although this early school usefully explained how political behaviour is scripted by the formal rules of the institutional setting (Battilana, 2004), provided "answers that were largely descriptive" and was so abstract it lacked "explanatory punch" (DiMaggio and Powell, 1991, p.2).

Selznick (1948) was arguably the first analyst to break from the traditional view of institutions by postulating that individuals within organisations can hold multiple goal-sets. From an economics perspective, Coase (1937, 1960) and Williamson (1975, 1985) used institutions as the primary unit of analysis to demonstrate that institutions arise and persist when they provide benefits which are greater than transaction costs. Despite the validity of these early formulations, the expansion of neoclassical institutionalism only took root during the late nineteen seventies to the early eighties in the seminal works of Meyer and Rowan (1977); Meyer and Hannan (1979) and DiMaggio and Powell (1983).

DiMaggio and Powell's (1983) revisiting of Weber's iron cage led to a significant explosion of the literature on neo-institutionalism. Although there are variations across

[5] Isomorphic- similar in form and relation.

disciplines, all strands of neo-institutionalism share the common critique of the atomistic accounts of social processes (Barley, 2008). In sociology, neo-institutionalism emphasises the way in which institutional life establishes normative behaviour, conventions and taken-for-granted practices which shape and influence behaviour (DiMaggio and Powell, 1991). While these early works have their merits, they focused too strongly on institutional isomorphism in organisational analysis (Barley, 2008) and tended to ignore the role of agency, power and interest in the process (Garud *et al.,* 2007). In order to break from that overly deterministic view, DiMaggio (1988, p.14) formally introduced the idea of institutional entrepreneurship as a way of bridging the gap, declaring that "new institutions arise when organised actors with sufficient resources see in them an opportunity to realize interests that they value highly".

Since the publication of DiMaggio's (1988) work on institutional entrepreneurship, the literature on the topic has grown exponentially, with more than 60 peer-reviewed papers published in North America and Europe in the two decades that followed (Leca *et al.,* 2008). Hardy and Maguire (2008) were the first to map the field, followed closely by Leca *et al.,* (2008). The coverage of the topic represents an impressive array of empirical contexts, ranging from properties (e.g. Mutch, 2007; Leca and Naccache, 2006) to positions (Maguire *et al.,* 2004; Fligstein, 2001a), among other interesting features. For instance, some researchers (e.g. Greenwood *et al.,* 2002; Fligstein, 1997, 2001; Holm, 1995) have focused on investigating how actors have been able to become institutional entrepreneurs despite facing institutional constraints. To clarify, institutional constraints are the limitations or restrictions on the behaviour of stakeholders (Scott, 2008; Seo and Creed, 2002). Often, these constraints precipitate institutional entrepreneurship because actors are motivated to escape their limiting influences (DiMaggio, 1988). Works which have focused on institutional entrepreneurs as constraint-escaping actors have shown that uncertainty often prompts them to try and enact institutional change in institutional environments referred to as organisational fields (Hardy and Maguire, 2008).

Institutional entrepreneurship generally occurs in organisational fields (Fligstein, 2001a; DiMaggio, 1991; DiMaggio and Powell, 1983). For this reason, DiMaggio (1991) recommends that organisational analysis should include an examination of the field

because of its causal influences and its role in bridging organisational and societal levels. Although DiMaggio and Powell (1983, p.148) define the organisational field as "those organisations which, in the aggregate, constitute a recognized area of institutional life: key suppliers, resources and product consumers, regulatory agencies, and other organisations that produce similar services or products", there is broad disagreement on its definition and measurement. Consequently, precisely what constitutes an organisational field remains largely unresolved.

Several institutional analysts have tried to determine what organisational fields are. One group of analysts (Bourdieu, 1990; Fligstein, 1990; DiMaggio and Powell, 1983) has proposed that an organisational field is a "totality of relevant actors" in which organisations have shared systems of common meanings and interact more frequently among themselves that with actors from outside the field. Others (e.g. Zilber; 2006; Scott, 2004; Meyer and Scott, 1983; 1991) however believe that this is a rather narrow view of the field and contended that organisational fields are functional arenas occupied by "similar and dissimilar interdependent organisations operating in a functionally specific arena together with their exchange partners, funding sources and regulators" (Scott, 2004, p. 9). Yet another group of scholars (Fligstein, 1999; DiMaggio, 1988) has argued that the field is an organisational sphere fraught with power struggles and conflict. Some researchers (Scott, 2014; Powell *et al*., 2005) have a much broader view of the field, proposing that this is an open relational network, socially constructed by its constituents. In this way, these theorists believe that the field is formed by commonly integrated and intertwined relational networks, consequently it tends to emerge as a structured and structuring environment (Powell *et al*., 2005). Although these researchers have attempted to define the field, it remains a highly contested and underexplored topic, along with the enabling conditions that trigger institutional entrepreneurship in organisational fields (DiMaggio, 1988).

Enabling conditions are essential precursors to institutional entrepreneurship because they are the rules which facilitate, support and supplement institutions (Lawrence and Suddaby, 2006). Two categories of enabling conditions have received the bulk of attention in the literature, field-level conditions and actors' social positions in organisation fields (Battilana *et al.,* 2009). While field-level conditions are the jolts, crises and internal

contradictions which disturb the socially constructed field-level consensus (Greenwood *et al*., 2002; Fligstein, 1997), actors' social positions are the situations of actors in organisational fields which dictate how they relate to their social settings (Battilana *et al*., 2009; Emirbayer, 1997). Other endogenous drivers for institutional change are internal contradictions (political struggles) and the isomorphic characteristics of actors within the field (Greenwood *et al.,* 2002). Exogenous factors include shocks and environmental jolts, *inter alia* (Leca *et al.,* 2008). Environmental jolts are defined by Meyer (1982, p.515) as "transient perturbations whose occurrences are difficult to foresee and whose impact on organisations are disruptive and often inimical". Across the broad range of literature surveyed, these factors have been the main triggers of institutional entrepreneurship.

Institutional entrepreneurship refers to the "activities of actors who have an interest in a particular institutional arrangement and who leverage resources to create new institutions or transform existing ones" (Maguire *et al*., 2004, p.657). A rich stream of research (Wijen and Ansari, 2007; Garud *et al.,* 2002; Lawrence *et al.,* 2002) has shown that it involves institutional entrepreneurs using intervention strategies to dislodge existing institutional practices (in mature fields), introduce new ones and then ensure that they become widely adopted and taken for granted by others in the field (Hardy and Maguire, 2008). This may for example be the use of strategies such as lobbying governments for new or revised regulations (Jolly and Raven, 2015; Walker *et al.,* 2014), being technical and market leaders (Fligstein, 1997; Maguire *et al.,* 2004) and professional associations persuading their members to standardise new procedures (Greenwood *et al*., 2002). Institutional entrepreneurship involves using mechanisms such as coercion to influence actors to participate in institutionalisation projects (Greenwood *et al.,* 2002); mimicry (Hargadon and Douglas, 2001); discourse (Garud *et al.,* 2007) theorising (Greenwood *et al.,* 2002); forming relationships (Wijen and Ansari, 2007) and other deliberate actions to try and change the *status quo* (DiMaggio, 1988).

Institutional entrepreneurship is also a highly discursive process (Zilber, 2002). As some scholars (Garud *et al*, 2002; Seo and Creed, 2002; Zilber, 2002; Benford and Snow, 2000) have shown, institutional entrepreneurship involves providing legitimising accounts of institutionalisation projects by the appropriate framing of the intended change initiate to attract collective action. "A 'collective action frame' is a coherent interpretive structure

that accomplishes three tasks": (1) punctuation; (2) elaboration; and (3) motivation (Creed *et al.,* 2002). Referred to in this way, punctuation means identifying a problem and underscoring its importance, whereas elaboration involves diagnosing the problem and identifying who or what is responsible for it (Hardy and Maguire, 2008). Motivations in this context means encouraging actors to participate in change (*ibid,* 2008, p.208). Relatedly, some researchers (Greenwood *et al.* 2002; Strang and Meyer, 1993) have explored how some actors identify problems in existing practices and then frame their arguments in such a way, others are mobilised to provide new and better solutions. In practice, these actors may set the agenda to promote their preferences and priorities, producing texts such as press releases, reports, website materials, speeches, interviews, *inter alia* (Genus, 2012) to make sense of their intended solutions (Greenwood *et al.*, 2002). If they are successful, they qualify as institutional entrepreneurs (Hardy and Maguire, 2008).

One body of research (e.g. Jolly and Raven, 2015; Déjean *et al.*, 2004; Garud *et al.,* 2002) has identified who institutional entrepreneurs might be. Jolly and Raven (2015, p.1000) identified institutional entrepreneurs as "executives in firms, profit-oriented entrepreneurs, trade associations, professionals in organisations, regulatory authorities, licensing bodies, scientists, government officials, professional associations, civil servants, educational institutions, media, consumers, civil society groups, the larger public". Sarasini (2013) added to that list by identifying regions (the European Union), while Child *et al* (2007) determined that some countries (e.g. China) acted in the capacity of institutional entrepreneurs. Irrespective of the diverse range of actors who assume this role, institutional entrepreneurs are either individuals or organisations who initiate divergent institutional change within organisational fields (Battilana, 2007; Fligstein, 2001a; DiMaggio, 1991; DiMaggio, 1988; DiMaggio and Powell, 1983).

Some researchers have considered the properties of institutional entrepreneurs, employing critical realism (e.g. Mutch, 2007; Leca and Naccache, 2006) and more latterly longitudinal case studies to inform their work (e.g. Walker *et al.,* 2014). These researchers have identified three main characteristics of institutional entrepreneurs. First, they are resourceful, using the necessary resources to influence institutional rules and reshape their organisational fields (Mutch, 2007; Leca and Naccache, 2006). Second, they are

knowledgeable (Mutch, 2007), using their knowledge of the field and the tactics available to them to produce and reproduce institutions (Walker *et al.,* 2014). Third, they possess the social skills needed to motivate others to support their institutionalisation projects (Battilana, 2004). As Dorado and Ventresca (2013) contend however, actors are more likely to engage in endeavours in which outcomes can be privatised, rather than those which serve as collective gains. This suggests that although some institutional entrepreneurs possess the social skills to mobilise collectives, they may choose to initiate institutionalisation projects which yield self-gratifying results because of vested interests (Hirschman, 1958).

Institutional entrepreneurs are also reflexive (Mutch, 2007), imaginative actors who often avoid presenting their institutionalisation projects as being too radical as this discourages potential allies from supporting these ventures (Maguire and Hardy, 2006). In most situations, they design their projects in such a way that once they become diffused, they are ceremoniously adopted and continuously maintained (Leca *et al.,* 2008; Greenwood and Suddaby, 2006; Maguire *et al*., 2004). One line of research (Maguire *et al.* 2004; Greenwood *et al.,* 2002) has however found that the positions institutional entrepreneurs occupy in their respective fields bear heavily on their ability to institutionalise new practices, rules and institutional logics. For instance, Maguire *et al.* (2004) determined that despite being afflicted by the paradox of embedded agency, powerful actors located in dominant positions in mature fields were able to change existing institutions or create new ones.

As mentioned earlier, institutions are central to institutional entrepreneurship research because they are the structures (Giddens, 1984) created or reformed by institutional entrepreneurs to achieve interests they value highly (DiMaggio, 1988). Straightforward as this may seem, this may be a difficult idea to grasp because institutions mean different things to different people (Jepperson, 1991). For instance, whereas some individuals believe that institutions are facilities such as schools, hospitals and prisons, others perceive that these are particularly large, or important, associations (*ibid,* 1991, p. 143). While these are not inaccurate assumptions, these are rather narrow views of what institutions actually are. MacIver (1931, p.16) quite usefully broadens this scope by describing institutions as “organised, established procedures”, while Huntingdon (1965)

argues that these are valued, stable, recurring patterns of behaviour. In other words, institutions are "the rules of the game" (Jepperson, 1991, p.143) or put differently, the structures and mechanisms of social order (Durkheim, 1964).). It therefore follows that institutional entrepreneurs are rule makers, rather than rule takers (Child *et al*., 2007).

North (1990) aggregated institutions into two broad categories, formal and informal. Formal institutions are the written constitutions, rights, regulations and policies encoded in laws; whereas informal institutions are the usually unwritten social customs, norms and traditions which shape behaviour and thought (North, 1990). In practice, formal and informal institutions can either complement, overlap, undermine or substitute each other (Palthe, 2014). In some cases, informal institutions have been known to shape the design of formal state institutions (North, 1990). Distinguishing institutions this way usefully illustrates how institutional entrepreneurs create institutions to stabilise their situations (Fligstein, 2001a), however, it also shows that if this not skilfully done, they can undermine each other. On the other hand, one of the main limitations of North's (1990) taxonomy is its overemphasising of the rule-like characteristic of institutions and it's underemphasising of their normative and cultural-cognitive aspects. Scott (2001) also spotted this analytical discrepancy and proposed a more stratified taxonomy of institutions. In his work, Scott (2001) posits that organisations and actors conform to rules because their behaviour is constrained by three institutional pillars: regulative, normative and cultural-cognitive processes. Table 1 illustrates how these pillars facilitate and support stability in an organisational setting.

Table 1: The Three Pillars of Institutions ***Adapted from Scott, 2001***

Theory element	**Regulative**	**Normative**	**Cognitive**
Basis of compliance	Expedience	Social obligation	Taken for granted
Mechanisms	Coercive	Normative	Mimetic
Logics	Instrumentally	Appropriateness	Orthodoxy
Indicators	Rules, laws, sanctions	Certification, accreditation	Prevalence, isomorphism
Basis of legitimacy	Legally sanctioned	Morally governed	Culturally supported, Conceptually correct

Scott (1995; 2001; 2003) theorised that institutions are transported by four carriers: (1) routines; (2) artefacts; (3) relational systems; and (4) symbolic systems. Whereas routines are the habitualised, patterned behaviour which reflects tacit knowledge held and conveyed by actors; artefacts are the material culture created by human ingenuity to assist in the performance of tasks (Scott, 1995; 2001). Artefacts are the material culture created ingeniously by humans to assist with the performance of tasks (Scott, 2003). Relational systems are the interpersonal and inter-organisational linkages which connect actors and organisations, while symbolic systems are the various types of symbolic schemata into which meaningful information is coded and conveyed (*Ibid*, 2003, p.882).

Symbolic systems are the various types of symbolic schemata into which meaningful information is coded and conveyed (Scott, 2003). Regulations and laws are among the most influential and widely recognised modes of symbolic systems (*Ibid*, 2003, p.886). Collectively, the four carriers are central to institutional entrepreneurship because they convey the regulatory, cultural-cognitive and normative elements required to enforce or change established practices (Palthe, 2014). This is paramount because institutions are resilient, multi-faceted social structures which comprise social activities, symbolic elements and material resources (Scott, 2008). As can be gathered from Table 1, institutions are based on rules, structures, schemes, routines and norms, which once they become institutionalised and diffused, are the basic requirements for organisations and individuals to gain legitimacy, support and stability (Scott, 2004; Suchman, 1995). Yet, one must recognise that institutional effects cannot be confined to explanations of stability because the reconfiguration of existing institutional arrangements can cause instability (DiMaggio, 1988; Greenwood *et al.*, 2005).

In spite of their connotation of stability (Scott, 2014, 2008), resistance to change (Lawrence, 2008), durability (Meyer, 2008) and persistence (Holm, 1995), institutions are susceptible to change (DiMaggio, 1988). Institutions have a higher propensity to change when they are characterised by internal contradictions (Greenwood *et al.*, 2005; Seo and Creed, 2002; Zilber, 2002) and uncertainties (Déjean *et al.*, 2004) because these constraints motivate actors to try and enact institutional change (Greenwood and Suddaby, 2006; Greenwood *et. al*., 2002). Jepperson (1991) proposed four institutional change mechanisms: institutional formation; institutional development; deinstitutionalisation and

re-institutionalisation. Collectively, these mechanisms may be described as the institutional logics (Thornton and Ocasio, 1999) because they bear heavily on the degree of agency possessed by field occupants (Fligstein, 2001a).

Institutional formation involves the departure from social entropy; reproductive patterns based upon action, or from non-reproductive behavioural pattern (Jepperson, 1991). Put differently, institutional formation entails the birth of a new governance structure or logic (Scott, 2014). In the case of the field of energy provision, this may be new rules being created for the provision of energy. Institutional development represents a continuation of the existing institutional arrangements and connotes a state of no change (Jepperson, 1991). A notable example is the continued use of petroleum for fuelling motor vehicles globally. As Scott (2001) usefully explains, deinstitutionalisation entails the dissolving of existing governance structure or logic. For instance, the widespread view that solar PV cannot reach grid parity being dispelled in recent years (Wirth, 2015). Re-institutionalisation represents the departure from one type of institutionalisation and the entry into another institutional form, organised around different rules or practices (Jepperson, 1991). In such a situation, the process of institutionalisation is deemed to have occurred.

Greenwood *et al.* (2002) added to Jepperson's (1991) work by proposing a six-stage model of institutional change. In this work, the theorists proposed that "theorisation" is a key stage in the process, whereby actors specify general organisational failing(s) and then justify abstract possible solution(s). In concluding, they argued that associations play a role in the process by collectively defining and redefining the institutional logic in an organisational field (*ibid*, 2002, p.76). Institutional logics are central to institutional entrepreneurship theory because they focus on the way in which broad belief systems shape the behaviour and cognition of actors (Thornton and Ocasio, 1999). It is important to consider these abstract entities when undertaking institutional entrepreneurship research because they provide the link between individual agency, socially constructed institutional practices, rule structures and cognition (Thornton and Ocasio, 2008). Put simply, institutional logics are the dominant belief systems and associated practices that reflect a field's shared understanding of the goals to be pursued and how they should be approached (Battilana *et al.*, 2009). Over the years, one of the central questions which has

challenged institutional analysts is "how can actors change institutions if their actions, intentions, and rationality are conditioned by the very institution they wish to change?" (Holm, 1995, p. 398). Institutional logics shed light on this problem, dubbed the paradox of embedded agency, by conceptualising society as an inter-institutional system in which logics are defined by contradiction, cultural differentiation and fragmentation (Thornton and Ocasio, 2008; DiMaggio, 1997). Institutional entrepreneurs use various mechanisms to try and overcome this constraint (Zilber, 2006), however, this has proven to be challenging due to competing institutional logics (Thornton and Ocasio, 2008).

The effect of competing institutional logics[6] in organisational fields is a central concern for institutional entrepreneurship research because this may either facilitate or hinder institutional change (Thornton and Ocasio, 2008). As Hoffman (1999) demonstrated, latent logics tend to be suppressed by dominant logics, therefore highly institutionalised fields with competing logics are particularly prone to this effect. A diverse range of literature has focused on these dynamics, however, this area remains largely unexplored in the case of the renewable energy subfield. Some researchers have however examined this effect in fields such as the environmental community (Haveman and Rao, 1997); healthcare (Scott *et al*., 2000; Reay and Hinings, 2005); gastronomy (Rao *et al.,* 2003); the public sector (Meyer and Hammerschmid, 2006) and banking (Marquis and Lounsbury, 2007). Of these studies, Reay and Hinings' (2005) research shows that competing logics created a highly "conflictual" Canadian healthcare field and field-level institutional change was only achieved after a power-sharing agreement had been brokered between the state and physicians. It is therefore clear that power is a major factor in creating and maintaining the dominant logic (Thornton and Ocasio, 2008).

Power is central to DiMaggio's (1988) thesis of institutional entrepreneurship as actors are perceived to draw on this resource to either initiate institutional change or maintain the *status quo.* This construct is defined by Lawrence (2008, p.174) as the "property of relationships such that the beliefs or behaviours of an actor are affected by another actor or system". Power is an important unit of analysis because institutions only exist insofar as they are powerful entities (Lawrence, 2008) and institutional entrepreneurs

[6] Contradictory sets of principles by which meaning is provided to social reality.

primarily engage in institutional work to create or reconfigure them (Lawrence and Suddaby, 2006; DiMaggio, 1988).

Two markedly different categories of power have been identified in the literature, systemic power (Stone, 1980) and episodic power (Clegg, 1989). Systemic power is "that dimension of power in which durable features of the socioeconomic system (the *situational* element) confer advantages and disadvantages on groups (the *intergroup* element) in ways predisposing public officials to favour some interests at the expense of others (the *indirect* element)" (Stone, 1980, p.980). In other words, systemic power is the ability of an individual or organisation to access and control the institutions sanctioned by the state. In contrast, episodic power is a more individualistic form of power in which self-interested actors discretely mobilise strategic acts (Lawrence, 2008; Clegg, 1989). A review of the literature indicates that systemic power may provide actors with a greater degree of agency than episodic power because the former tends to be legally sanctioned, unlike the latter which gains its legitimacy culturally (Scott, 2001). Since highly institutionalised fields are ongoing arenas of power struggles (Maguire *et al.,* 2004), there is always the opportunity to change existing institutional arrangements (Maguire *et al.,* 2004) and gain legitimacy (Suchman, 1995).

Legitimacy is central to the process of institutional entrepreneurship because it provides institutional entrepreneurs with the social acceptance and credibility they need to survive and thrive (Dacin *et al*., 2002). From the perspective of institutional theory, legitimacy is the general belief that the actions of an organisational entity are acceptable; appropriate and desirable (Suchman, 1995). Khan *et al*., (2007) underpins this view by arguing that institutional entrepreneurs are agents of legitimacy who support the creation of institutions which they value highly and deem appropriate. This is particularly so in the case of actors who embark on a new line of activity since they are often faced with the daunting task of gaining acceptance for their own validity as practitioners and/or for the propriety of the activity itself (Markard *et al*.,2016; Suchman, 1995). In his seminal work for example, Suchman (1995) proposes that there are three legitimising strategies: conformance, selection and manipulation. Whereas conformance refers to actors conforming to the existing demands and expectations of an organisational field, with selection there is some level of conformity but individuals are allowed to select among the

various internal environments (*ibid,* 1995, p.587). Manipulation refers to changes being made to the internal environment to achieve consistency between that institutional domain and strategy (*ibid*, 1995, p.590). More recently, Markard *et al*. (2016) investigated legitimacy in a technological field and established that this characteristic is more fluid than previously documented. In their study of the biogas sub-community in Germany, they found that the legitimacy of this technology fluctuated over time, by first being relatively low due to being a novel technology, then increasing significantly as it was perceived as being the solution to the prevailing problems in agriculture, then decreasing again when the consequences of widespread energy crop farming became apparent (*ibid*, 2016, p.141). Markard *et al.* (2016) concluded that despite its successful expansion, the legitimacy of biogas was undermined by the misalignment of the institutions as this impacted negatively on the decisions of actors.

Relatedly, the different dimensions (e.g. Archibald, 2004; Suchman, 1995; Scott, 1995; Suchman, 1995) may be appropriate for explaining how legitimate organisations offer "acceptable theories" of themselves. In this regard, coupling Scott's (1995) trichotomy with Suchman's (1995) dimensions, might be sufficiently analytical for determining and explaining how legitimacy is attained and conferred. Scott's (1995) model is useful for establishing if legitimacy is attained/conferred on a regulative, normative or cultural-cognitive basis (see Table 1), while Suchman's (1995) model distinguishes if legitimacy is attained/conferred pragmatically; morally or cognitively. As can be seen from these offerings however, there are overlaps hence care must be taken during their application.

Another area which remains largely unexplored is the measurement of legitimacy (Greenwood *et al*., 2008). Some institutional theorists have however attended to this in other fields, for example, Suchman, (1995) and Meyer and Scott (1983) believe that completely legitimate organisations are at the upper end of the spectrum because their existence is unquestionable and they are widely accepted. These organisations are likely to have high survivability, dispersal and reproductive rates (DiMaggio and Powell, 1983); freedom to pursue their activities (Child, 1972) and likely to attract more investments than their illegitimate counterparts (Zimmerman and Zeitz, 2002). These illegitimate actors are entities which deviate from accepted rules or standards and have not gained acceptance

for themselves or their activities (Pfeffer and Salancik, 1978). It is likely that they have low survival rates because many questions can be asked about them and better alternatives presented (DiMaggio and Powell, 1983). They are also less likely to self-reproduce and attract the investment (Zimmerman and Zeitz, 2002) often required for institutionalisation projects (Hardy and Maguire, 2008; DiMaggio, 1988).

The broad range of literature surveyed for this thesis (see Table 2 in the next section) has shown that institutional entrepreneurship involves the institutionalisation of new organisational forms, however, they often provide a rather lopsided view of the process by portraying it as a win-win process. Some critics (e.g. Mutch, 2007) have also cast aspersions on institutional entrepreneurship theory for alluding to the classical debate on agency versus structure as this implies that actors disengage from their social contexts and act to change them. Others (e.g. Battilana, 2004) denigrate the approach for failing to resolve the paradox of embedded agency. Weik's (2011) openly criticises the thesis, pointing out that although DiMaggio (1988) is explicit about the reintroduction of agency into organisational studies, he did not explicitly refer to an action theory. This is compounded by institutional theory having "smuggled" elements of the rational actor model into institutional entrepreneurship research through the back door (Weik, 2011).

One of the few studies which provides empirical evidence of potentially negative outcomes of institutional entrepreneurship is that conducted by Khan *et al.,* (2007). In their research on institutional entrepreneurship in one of the world's largest clusters of soccer ball manufacturers in Sialkot, Pakistan, Khan *et al.,* (2007) found that power operated hegemonically to deal with the issue of child labour, resulting in a detraction from the darker side of the practice. This may be attributed to changing deeply entrenched institutional norms being a wicked problem (Dorado and Ventresca, 2013). Wicked problems are difficult or impossible to solve because of contradictory, incomplete or changing requirements which are generally difficult to recognise (Rittel and Webber, 1973). One of the most pertinent characteristics of wicked problems is that they are never fully resolved (Dorado and Ventresca, 2013), which suggests that institutional entrepreneurship is an ongoing process. Although controversy abounds on the process, institutional entrepreneurship is increasingly being analysed in a variety of organisational fields, ranging from the emerging (e.g. Rao, 1998; Lawrence, 1999; Zimmerman and

Zeitz, 2002) to the more established (Durand and McGuire, 2005; Suddaby and Greenwood, 2005). In spite of the growing body of institutional entrepreneurship research, one area which remains largely unexplored is the renewable energy subfield, as the review of recent empirical work in the next section determined.

2.3.2 Summary

This section reviewed relevant background literature pertaining to institutional entrepreneurship theory, and when necessary, also considered institutional theory. It has shown that institutional theory focuses on the stability and change of institutions, while institutional entrepreneurship theory is a new branch of institutional theory that reintroduces actors' agency into institutional analysis.

The chapter sifted through some of the seminal works on institutional entrepreneurship theory to reveal that its core principles concern organisational fields; institutions; enabling conditions; the process of institutional entrepreneurship; institutional entrepreneurs; institutional change; institutional logics; power; agency and legitimacy. Here, the literature established that the process of institutional entrepreneurship occurs in institutional environments referred to as organisational fields, when actors, referred to as institutional entrepreneurs, seek to change or maintain existing institutional arrangements to promote interests they value highly. Organisational fields are characterised by their enabling conditions. Two categories of enabling conditions have received the bulk of attention in the literature, field-level conditions and actors' social position. While field-level conditions are the jolts, crises and internal contradictions, actors', actors' social positions are the situations of actors in organisational fields which dictate how they respond to their social settings. Enabling conditions either motivate or demotivate actors from practising as institutional entrepreneurs.

As the section revealed, institutional entrepreneurs may take many forms: individuals; entire countries; private corporations; state departments; *inter alia*. The primary activity of institutional entrepreneurs is to create or reform institutions. Institutions are central to institutional entrepreneurship theory because they are the structures that bring order and stability to social life. Again, institutions are diverse entities, ranging from a simple handshake to the rules of law (e.g. legislation; regulations; etc.). Institutional entrepreneurs change existing institutional arrangements by enacting

institutional change, a practice that utilises strategies such as theorising; decoupling; de-institutionalising; or; even changing the institutional logics in a field. Institutional logics are the belief systems that shape the behaviour and cognition of actors. However, the capacity of institutional entrepreneurs to reform institutions rests heavily on their power and agency.

Power is the property of an actor or system that enables them to alter the beliefs or behaviours of others, while agency is their capacity to realise this change. Even more importantly, they must gain legitimacy. Legitimacy is the general belief that the actions of an organisational entity are acceptable; appropriate and desirable. By gaining legitimacy, an actor earns the right to be called an institutional entrepreneur. Having reviewed the literature which documents the core principles of institutional entrepreneurship theory in this section, the next section reviews recent empirical studies to see how these principles might have been applied in those empirical settings.

2.4 EMPIRICAL STUDIES ON INSTITUTIONAL ENTREPRENEURSHIP IN THE RENEWABLE ENERGY SUBFIELD

This section reviews the eight recent empirical institutional entrepreneurship research conducted on renewable energy in the broad range of empirical settings. This is an important undertaking because it identifies the works which have already been done on the topic (there is no point in doing the thesis if it has already been done); it critiques these publications; informs on the methodologies used by the researchers and identifies any gaps in knowledge. The section has eight subsections. The first six subsections review the empirical studies by aligning them with appropriate themes. Subsection 2.4.8 concludes the section by summarising what the review of these empirical studies has discovered.

2.4.1 Organisational Fields: Fertile Grounds for Institutional Entrepreneurship

An overview of the most recent empirical studies on institutional entrepreneurship in the renewable energy subfield has yielded evidence of three types of inquiries: (1) an actor-centric strand that focuses on institutional entrepreneurs as enactors of institutional change (Sarasini, 2013); (2) a process-centric stream which produces narratives about the struggles they face (Walker *et al.,* 2014; Jolly and Raven, 2015) and (3) a holistic inquiry that combines both approaches (Smink *et al.*, 2015; Sine *et al.*, 2005; Xiangli, 2008). Although the focus of these investigations contrasts, all three threads are concerned with

demonstrating how some actors have practised as institutional entrepreneurs by enacting institutional change within organisational fields (Fligstein, 2001a; DiMaggio, 1991; DiMaggio and Powell, 1983). Sarasini (2013) for example, investigated corporate political action (CPA) in the Swedish electricity industry and found that the European Union (EU) practised as an institutional entrepreneur by creating new institutions to drive climate-related investments in that sector.

Sarasini's (2013) study utilised qualitative approaches (interviews and document analysis) to examine the influence of CPA on addressing the problem of climate change. The main research question was: "*How do companies engage in institutional dimensions when resource dependencies are a mediating factor?*" To answer the research question, a total of thirty-three semi-structured interviews were conducted with informants from Swedish electricity producers, lobby organisations and industry associations. This was supplemented by a document analysis of position papers published on company and industry association websites.

Table 2: Recent Empirical Studies in the Field of Energy Provision of Relevance to this Thesis

Reference	Type & Context	Aim (s)/Methodology	Results/Conclusions
Genus, A. (2012). *Changing the rules? Institutional innovation and the diffusion of microgeneration.* Technology Analysis & Strategic Management, Vol. 24(7), p.711-727.	Empirical study that uses institutional theory to gain a deepened understanding of issues related to the microgenerated sector in the UK.	The aim of Genus' (2012) study was to show that compared with work on barriers to microgeneration, new insights may be produced by considering the role that rules play in maintaining the prevailing system of energy generation. Genus' (2012) study is qualitative study which involved thirty-one (31) 1-2 hour taped interviews being conducted with informants connected with the field of microgeneration in the North East of England.	Genus' (2012) finds that a commonly held view from the different actors' categories is that it is extremely crucial that the scene is economically and fiscally conducive by instituting sufficient and continuing grants and subsidies to encourage R&D and adoption of microgeneration technologies and relevant emissions trading, carbon offsetting and other schemes. The researcher also finds that national and local government action can potentially promote the awareness of climate change and the need to reduce carbon emissions. Other salient comments made by the informants were the lack of joined-up thinking across different state departments and agencies which makes the processes too bureaucratic.

Jolly, S. and Raven, R.P. (2015). *Collective institutional entrepreneurship and contestations in wind energy in India*. Renewable and Sustainable Energy Review, Vol.42, p.999-1011.	Empirical study that applies the idea of collective institutional entrepreneurship to analyse the Indian wind energy sector.	The aim of Jolly and Raven's (2015) study was to shed light on institutional changes in the Indian wind energy sector by considering the positive impacts, the controversies and potential barriers against the adoption of the technology. The methodology for the research was a qualitative case study approach which combined multiple sources for data collection. The researchers used content analysis to analyse secondary data related to the history of the Indian wind energy industry from the internet. Jolly and Raven (2015) then conducted semi-structured interviews with 12 informants connected to the industry between May and August 2012. The data were analysed qualitatively	Jolly and Raven (2015) determined that the development of the wind energy industry in India was driven by the collective efforts of institutional entrepreneurs who used two separate strategies: supportive techno-economic and socio-political networks and an indigenous innovation infrastructure. The researchers also found that conflicts and contestations between different stakeholders were resolved through forums. Jolly and Raven (2015) recommended that future wind energy development in India should focus on targeted support mechanisms and withdraw these when sufficient capability levels have been attained. In concluding, the researchers warned policymakers about the detrimental consequences of the sudden withdrawal of incentives.

Provance, M; Donnelly, R; Carayannis, E. (2011). *Institutional influences on business model choice by new ventures in the microgenerated energy industry*. Energy Policy, Vol. 39, p.5630–5637.	Theoretical study that draws on institutional theory for organisational analysis. Research context: microgeneration sector in the UK.	Provance *et al.*'s (2011) study examined the roles of socio-institutional and politico-institutional dynamics in the choice of business models for microgeneration. The methodology involved reviewing literature on business model design and the microgeneration sector and then proposing a framework for understanding the role of external institutional factors in business model design in the microgenerated energy industry.	The research finds that although business model design plays an importance source of competitive advantage for new ventures, existing literature tends to limit the design process to strategic management of internal resources. Provance *et al* (2011) concluded that business model design for the sector should be based less on firm decision-making and more on variables that exist within innovation systems and political structure, cognitive abilities of entrepreneurs, local socio-technological conditions and corresponding stakeholders.
Sarasini, S. (2013). *Institutional work and climate change: Corporate political action in the Swedish electricity industry*. Energy Policy, Vol. (56), p.480-489.	Empirical study that uses institutional theory to examine the influence of resource and institutional mechanisms on institutions in Sweden.	The aim of Sarasini's (2013) study was to utilise qualitative methods to examine the factors which influence corporate political action (CPA) in the Swedish electricity industry. The study utilised qualitative methods (document analysis and thirty-three (33) semi-structured interviews) to examine the motives and drivers for CPA in the Swedish electricity industry sector.	Sarasini (2013) finds that CPA is driven by the need to manage external resource dependencies and where risks are more acute, companies are more likely to seek to disrupt regulative institution. The researcher however concluded that the EU has been acting as an institutional entrepreneur by using its institution, EU-ETS, to transform the Swedish energy sector.

Sine, W.D; Haveman, H.A. and Tolbert, P.S. (2005). *Risky Business? Entrepreneurship in the New Independent-Power Sector.* Administrative Science Quarterly, Vol. 50 (2), p.200-232.	Qualitative research involving content analysis of documents related to the independent power sector in New York and California from 1980 to 1992.	Sine *et al.* (2005) used content analysis to analyse documents detailing the intention of new ventures to build independent power plants and media coverage. The researchers assessed media coverage by searching the Lexus Nexus online database for articles that discussed the emerging independent power sector using relevant search terms to identify relevant articles. Sine *et al* (2005) used event history analysis to examine the transition of firms in the independent power sector from qualifying facilities (QF) to operational start-up. Sine *et al* (2005) analysed their data using the semi-parametric Coxmodel (Kalbfleisch and Prentice 1980) to estimate the effects of the independent variables on changes in the hazard rates.	Sine *et al* (2005) find that that the development of regulative and cognitive institutions legitimated the entire sector and provided incentives for all sector entrants; thus, founding rates of all kinds of firms multiplied rapidly but had a stronger impact on those using risky novel technologies. Conversely, the central normative institutions that developed in this sector, state-level trade associations, provided greater support for particular forms (those using established technologies) and thus increased founding rates of those favoured forms more so than founding rates of less favoured forms (those using novel technologies). Sine *et al* (2005) concluded that institutional forces can alter the mix of organisations entering a new industry and thus contribute to diversity, as well as similarity, among organisations.

Smink, M; Koch, J; Niesten, E; Negro, S. and Hekkert, M. (2015). *Institutional entrepreneurship in the emerging renewable energy field: incumbents versus new entrants.* Conference Proceedings, DRUID15, Rome, June 15-17, 2015.	Empirical study investigating the activities of cooperation, framing and political tactics in the case of biochemical development in the Netherlands, during the period 2006-2012.	The aim of Smink *et al.*'s (2015) research was to analyse the differences between the activities of incumbent and new entrants when promoting institutional change in the biomethane sector in the Netherlands. The methodology used for the research was a qualitative case study which combined data from multiple sources. Data collection involved content analysis of 250 news articles in Dutch newspapers using the terms "biogas", "biomethane" and "gas network" for the period 2006-2012. Other publications such as policy documents, business publications and other relevant publications were analysed. Fifteen semi-structured interviews were also conducted with experts belonging to the field. The data were analysed qualitatively.	Smink *et al.,* (2015) found that prior to incumbents from the gas sector entering into the bio-methane sector, biogas farmers were unable to build the requisite supportive institutional framework. After these incumbents entered the bio-methane sector in 2006 however, bio-methane started receiving substantial support from the government. Smink *et al.,* (2015) determined that incumbents used the national press to create legitimacy for their policy differences, whereas new entrants used the agricultural media to inform peers, hence the variance in success. The researchers therefore concluded that the entrepreneurial activities of incumbents led to more substantial institutional change than new entrants.

Walker, K; Schlosser, F. and Deephouse, D. (2014). *Organisational Ingenuity and the Paradox of Embedded Agency: The Case of the Embryonic Ontario Solar Energy Industry*. Organisation Studies, 2014, Vol.35 (4), p.613-634.	Empirical study that uses institutional theory to investigate the solar energy industry in Ontario, Canada.	The aim of the study was to investigate the role of organisational ingenuity in the paradox of embedded agency within the embryonic solar industry in Ontario. The methodology used for the research was a longitudinal case study which analyses data from the interviews of 22 industry stakeholders during 2009-12 and the content analysis of media reports.	The study finds that there are two major institutional constraints in the Ontario solar industry, political uncertainty and limited grid access. This led to four ingenuity strategies that emerged at different levels of analysis that complied with, challenged, or escaped the constraints. The researchers concluded that when confronted by significant institutional constraints, firms can circumvent them ingeniously and legitimately through measures such as providing electricity for people off grid and providing jobs affected by a decline in the automobile industry.

Xiangli, L. (2008). *An emerging niche for firms in western regions of China in the period of transition economy to develop renewable energy industry: a perspective from institutional entrepreneurship.* Management, Science & Engineering, Vol 2, (4), p.24-31.	Theoretical study using institutional theory to investigate the emerging renewable energy industry in the western regions of China.	The aim of the study was to explore the enabling role of institutional entrepreneurship in the western regions of China, a transitioning economy. The methodology used for the study was to review existing literature based on that research context, drawing heavily on Child *et al.'s* (2007) work.	The researcher finds that in a transitioning economy, both institution and technology (market) niche could be co-evolved under the enabling role of institutional entrepreneurs who take advantage of the enabling aspects of institutions in transitioning economies, while avoiding the potential constraint of institutions. The researcher concluded institutional entrepreneurs can play a pivotal role in renewable energy induction.

Sarasini (2013) found that where resource dependencies were not that significant to a company's operations (e.g. municipal companies which do not rely extensively on fossil fuels), there was an increase in the uptake of renewable energy. For that reason, the researcher posited that EU institutions should be regarded as the hub of institutional entrepreneurship across the electricity sectors of Member States because of their regulatory influences and the incentives they provided through subsidies (*Ibid,* 2013, p.488). Sarasini (2013) however conceded that although the EU practised as an institutional entrepreneur by creating these institutions to increase the uptake of renewable energy, the contributions of energy companies and other stakeholders cannot be discounted in the institutionalisation process. It was therefore concluded that the institutionalisation of climate change policy in the EU was not the work of a single actor, but that of industry stakeholders working collaboratively (*ibid,* 2013, p.488).

The study conducted by Sarasini (2013) provides useful insights as it demonstrates that the EU acted as an institutional entrepreneur to create new institutions such as the European Union emission trading scheme. It also highlights the benefits of using institutional theory to explore how institutional entrepreneurship addresses resilient, "rule-of-thumb" practices characteristic of highly institutionalised organisational fields (Greenwood *et al*., 2002). Despite these contributions, Sarasini (2013) failed to explore in sufficient depth the enabling conditions which triggered institutional entrepreneurship; the intervention strategies employed by institutional entrepreneurs and how they gained legitimacy for themselves and their activities. This suggests that this research might have benefited from conducting a more comprehensive inquiry which examined the key principles of institutional entrepreneurship, such as those highlighted in section 2.2 of this thesis. Nevertheless, by attending to the interplay between market and nonmarket forces within the Swedish electricity industry, Sarasini (2013) displayed a high level of research prudency by considering the power relationships within that organisational domain. The methods employed by Sarasini (2013) for data collection have also quite ably answered the research questions (Bryman and Bell, 2011), suggesting they may be suitable for gathering primary data for this thesis. Despite its merits, Sarasini's (2013) study has a number of drawbacks.

One of the main caveats of Sarasini's (2013) study is its failure to provide a detailed account of how old practices were deinstitutionalised and new ones institutionalised (DiMaggio, 1988). This is a notable failing because in modern societies, formal institutions such as policies arise in highly institutionalised contexts (Meyer and Rowan, 1977) which rely on a process of deinstitutionalisation and re-institutionalisation for full institutionalisation to take place (Greenwood *et al*., 2002; Jepperson, 1991). Another major drawback of Sarasini's (2013) research is its failure to explicitly consider the significance of institutional entrepreneurship having occurred in the sphere commonly referred to as an organisational field (Wooten and Hoffman, 2008; Bourdieu, 2005; 1990; Seo and Creed, 2002; Hoffman, 2001; DiMaggio, 1988; DiMaggio and Powell, 1983). This is a noteworthy omission because analysing the organisational field facilitates an understanding of the interactions between actors and organisations within organisational settings and explains how actors reflect upon and change the institutionalised contexts in which they are embedded (Leblebici *et al.,* 1991).

Another set of researchers who also failed to explicitly identify the organisational field in their research were Jolly and Raven (2015). In their study of the wind energy sector in India, the scholars examined the role of collective institutional entrepreneurship in creating the institutions which led to the development of that sub-community. As Wijen and Ansari (2007) explain, collective institutional entrepreneurship is a co-operative process involving the sustained collaboration of numerous dispersed actors with different frames of references, contradictions and tensions. Jolly and Raven's (2015) work is a qualitative case study which captured developments within the subsector over a twenty-nine years period by asking: "*How has institutional entrepreneurship shaped the development of wind energy in India during the period 1985–2014 and which controversies and conflicts can be identified*?" Multiple methods were used for data collection, including the analysis of historical data on the Indian wind energy sector, supported by semi-structured interviews to facilitate triangulation (Bryman and Bell, 2011).

Jolly and Raven (2015) found that no single actor controlled the development of the industry and that the institutionalisation process relied heavily on a range of strategies employed by multiple and heterogeneous actors. In concluding, the researchers asserted

that actions must be taken to include marginalised actors (e.g. laypersons and non-specialist stakeholders) in the development of the field so that their concerns can be heard (*ibid*, 2015, p.1009). The findings of Jolly and Raven's (2015) research are consistent with those of Sarasini (2013) who also determined that collaborative work enabled institutional entrepreneurs to transform existing and emerging institutions. Jolly and Raven's (2015) study however goes further by exploring the difficulties they faced whilst doing so. By so doing, the researchers have examined the struggles faced by actors when they were acting as institutional entrepreneurs within the Indian wind energy subfield, which is an important undertaking because such constraints are commonplace during the institutionalisation of organisational fields (Hardy and Maguire, 2008). By taking a process-centric approach, Jolly and Raven (2015) have demonstrated that the outcomes of institutional entrepreneurship are varied, ranging from no change because the prevailing discourses are too constraining, to radical change because the opportunities existed. Since the practice of institutional entrepreneurship is not neutral (Hardy and Maguire, 2008), Jolly and Raven's (2015) study provides useful insights by documenting the contestation which generally exist in organisational fields. On the other hand, Jolly and Raven's (2015) process-centric approach may have resulted in the role of agency receding into the background and the interplay between action, meaning and actors being neglected.

As mentioned earlier, Jolly and Raven (2015) failed to explicitly disclose the identity of the organisational field in which their inquiry was conducted. This reflects the tendency of the other recent empirical investigators who also failed to name the fields in which they conducted their inquiries. This contrasts with the work of some early institutional analysts such as Greenwood *at al*., (2002) and Greenwood and Suddaby, (2006) who explicitly identified their organisational fields. Greenwood *et al*., (2002, p.58) for example, defined their field of interest as the "professional business services field in Alberta, Canada". Failure to explicitly identify the organisational field being scrutinised may result in three main analytical discrepancies. First, this can cause a misunderstanding of the level of analysis at which the study is being conducted, that is, whether at a macro, meso, or micro-level (Babbie, 2015). Second, this overlook has resulted in a lack of fresh insights on the ongoing debate about organisational fields. As mentioned in section 2.2, exactly what constitutes an organisational field remains highly contested. Thirdly,

identifying the organisational fields is likely to have made the triggers of institutional entrepreneurship more apparent. In other words, the enabling conditions (Battilana *et al*, 2009; Lawrence and Suddaby, 2006).

2.4.3 Enabling Conditions for Institutional Entrepreneurship

Despite there being evidence of enabling conditions (Battilana *et al.,* 2009; Lawrence and Suddaby, 2006) having triggered institutional entrepreneurship in the various research settings, none of the recent empirical studies directly examined these important antecedents. This is a notable failing because enabling conditions create the rules that facilitate, support and supplement institutions to ensure organisational survival (Lawrence and Suddaby, 2006). Having the right enabling conditions is also important because they facilitate the legitimisation of renewable energy as a viable technological form (Walker *et al.,* 2014). Given the magnitude of this failing, this thesis now scrutinises the recent empirical studies to ascertain what might have been the trigger(s) of institutional entrepreneurship in those empirical settings.

An examination of Sarasini's (2013) work suggests that having the right policies enabled institutional entrepreneurs to change existing institutional arrangements in the Swedish electricity sector. This suggests that this was a field-level enabling condition (Battilana, *et al.,* 2009; Battilana, 2007) which had precipitated institutional entrepreneurship in that setting. Walker *et al.,* (2014) similarly reported a field-level condition by explaining that grid assess was an institutional enabler for the solar industry in Ontario because it had allowed renewable energy to be part of the province's energy mix. More recently, Jolly and Raven (2015) found that the success of institutional entrepreneurs in the Indian wind industry was largely dependent on their access to resources and their skills at leveraging it. This was found to be important because it enabled them to use tangible resources such as financial assets to build coalitions with other players during the early stages of the industry (1985-1995), while intangible resources such as social capital and legitimacy were used to impose the institutionalisation projects (*ibid,*2015, p.1003). This finding is consistent with that of other institutional theorists who found that institutional entrepreneurs have used discursive strategies and other capital to institutionalise their ventures (DiMaggio, 1988). Based on the descriptions of enabling conditions provided by institutional analysts (Battilana *et. al.,* 2009; Lawrence

and Suddaby, 2006; Fligstein, 1997), actors' social positions was the catalyst for institutional entrepreneurship in Jolly and Raven's (2015) inquiry.

Failure to identify the enabling conditions has resulted in a gap in knowledge of the opportunities and motivational factors which triggered institutional entrepreneurship in those organisational fields. Research into this important antecedent is likely to have facilitated a better understanding of the motivational factors which catalyse institutional entrepreneurship (Greenwood *et al*., 2002; Fligstein, 1997) in organisational settings, consequently initiating the deployment of intervention strategies.

2.4.4 The Deployment of Intervention Strategies in Organisational Fields

As section 2.2 disclosed, a rich stream of research (Wijen and Ansari, 2007; Garud *et al*., 2002; Lawrence *et al*., 2002) has shown that institutional entrepreneurs use intervention strategies to dislodge existing institutional practices (in mature fields), introduce new ones and then ensure that they become widely adopted and taken for granted by other actors in the field (Hardy and Maguire, 2008). Despite this centrality, only two of the recent empirical studies explicitly examined these important mechanisms in their inquiries, those by Smink *et al*., (2015) and Walker *et al.,* (2014).

Smink *et al*., (2015) examined institutional entrepreneurship in the biofuel segment of the renewable energy subfield to see if the activities of new entrants and incumbents had different effects on formal institutions in its development. The researchers found that one of the more impactful intervention strategies deployed by the institutional entrepreneurs was framing. Smink *et al*., (2015) observed that the incumbent energy providers framed their rationale for institutional change more effectively than the new entrants in terms of problem definition, narrative, tone and level of abstraction (*ibid*, 2015, p.13). For example, a typical narrative used by the incumbents was: '*You have a problem, we have a solution to help you*', whereas the new entrants pleaded: '*We have a problem, we deserve your help'* (*ibid*, 2015, p.13). Smink *et al*., (2015) posited that appropriate framing provided the incumbents with cognitive legitimacy, unlike new entrants who failed to gain legitimacy because poor framing had created an antagonistic relationship with the state.

Another important finding of Smink *et al's* (2015) research was that prior to incumbents from the more established gas industry entering into the bio-methane sector,

biogas farmers were unable to build the requisite supportive institutional framework. After these incumbents entered the bio-methane sector in 2006 however, bio-methane started receiving substantial support from the government. It was therefore concluded that the entrepreneurial activities of incumbents led to more significant institutional change than new entrants (*ibid*, 2015, p.25). Although Smink *et al's* (2015) study has made an important contribution to the debate since it highlights the disparity in the institutionalising capabilities of incumbents and new entrants in the renewable energy subfield, the integrity of the paper is questionable because it is poorly presented i.e. method of data analysis ambiguously stated, the limitations of their study not declared, among other presentational shortcomings. Another caveat of Smink *et al*'s (2015) work is its failure to provide a biographical account of the institutional entrepreneurs who brought about the changes. The central premise of institutional entrepreneurship is that it reintroduces agency, interests and power into institutional analyses of organisations (Garud *et al.,* 2007). This suggests that Smink *et al.* (2015) would have benefited from providing institutional biographies of the research participants as this would have provided a better understanding of their histories and how they may have been influenced and were influenced by the institutions which they changed or sought to change (Lawrence *et al*., 2011).

In their work which investigated the paradox of embedded agency within the embryonic solar industry in Ontario, Canada, Walker *et al*. (2014) found that some ingenuity strategies assisted actors in overcoming this constraint. In their four-year longitudinal case study, the agency component is represented by organisational ingenuity, while institutional constraints represent the embedded element (Walker *et al*., 2014). The researchers found that the introduction of four ingenuity strategies contributed to organisational transition and therefore recommended that policies should be introduced to facilitate this (Walker *et al*., 2014). These ingenuity strategies are (1) compliance strategy, constraint-challenging multi-stakeholder collaborations; (2) constraint-escaping new product and market development; (3) constraint-complying new product partnerships; and (4) constraint-escaping new product partnerships (*ibid*, 2014, p.20). Walker *et al*. (2014) concluded that although the paradox of embedded agency remained unreconciled, those four strategies contributed to minimising its effects (*ibid*, 2014, p.33). Although their

research has made a useful contribution to institutional entrepreneurship research, Walker *et al*. (2014) admitted that due to its qualitative nature, their study has limited literal generalisability (*ibid*, 2014, p.31). That however is not a major concern for this thesis because the main objective of qualitative research is not to generalise to population, but to provide a deep, rich understanding of a phenomenon (Bryman and Bell, 2011). Given this, Walker *et al*.'s (2014) study has provided useful insights for this research because it suggests that when the present investigation is being carried out, queries should be made as to whether these or other strategies have been, or can be employed by institutional entrepreneurs in the renewable energy subfield in the UK. One of the main caveats of Walker's *et al.*'s (2014) research however, is its numerical presentation of qualitative data in the final report (Bryman and Bell, 2011). Another flaw of their study is its failure to attend to the role of agency, power and interests in enacting institutional change or maintaining the *status quo* (Lawrence, 2008; Garud *et al*., 2007).

2.4.5 The Role of Agency, Power and Interests in Institutional Change and Inertia

One of the founding principles of institutional entrepreneurship is that it (re)introduces agency into institutional studies (Hardy and Maguire, 2008; Garud *et al.,* 2007; DiMaggio, 1988). At a basic level, institutional agency is the social action that creates, reproduces and changes institutions (Emirbayer and Mische, 1998). Relatedly, agency theory holds that conflicts arise between individuals with different interests in organisations because of dichotomous goal-sets (Weik, 2011). This is especially relevant to the field of energy provision because it comprises individuals and organisations with varying vested interests ((Marletto, 2012). In his work for example, Sarasini (2013) pointed out that although the EU could be regarded as a hub of institutional entrepreneurship, other stakeholders contributed to the institutionalisation of climate regulations. This provides clear evidence of the role of actors' agency in institutional change. Despite this centrality, this influence has previously received very little attention in the setting of the renewable energy subfield in the UK. One of the few contributors to break from this tradition is Genus (2012), who briefly discusses the topic in relation to the microgeneration segment of the field of energy provision in the UK.

In his study, Genus (2012) proposes a framework that allows for the initial conceptual orientation of the role of rules in energy system innovation or maintenance,

referring to the effect of agency in enacting institutional change or maintaining inertia. Here, the analyst proposes that actors connected within the field may work to create new institutional rules, which could in turn represent new business models, policy targets and standards, or novel technologies for supplying or consuming energy locally (*ibid*, 2012, p.713). Genus (2012) found that the institutionalisation of those rules occurs through an interdependent process of coercion; incentivisation; increased normalisation and obligation; skilful and enduring practices diffused through imitative learning and higher-order values increased through the legitimisation of new practices via sharing. The analyst concluded that partial institutionalisation occurs when the strength of factors required to create and institutionalised new institutions is moderate (*ibid*, 2012, p.714).

Although Genus' (2012) work has usefully introduced the idea of partial institutionalisation and the need to investigate the effects of actors' agency within the microgeneration segment of the field, it has the shortcoming of relying too heavily on the views of its informants. Although it is beneficial to capture the first-hand views of participants in exploratory studies (Babbie, 2015), informants' views can be biased by their institutional context (DiMaggio, 1991). Genus' (2012) work would have therefore benefited from the support of another data collection method (e.g. a document analysis or survey) as this would have facilitated triangulation (Bryman and Bell, 2011). Taken together, the majority of other researchers (e.g. Provance *et al.*, 2011; Sauter and Watson, 2007; Watson *et al.*, 2006) who have researched into renewable energy in the UK have also focused on the microgeneration segment of the field, rather than the entire subfield. This limitation cannot be ignored because agency may vary between the different technologies in the field (Geels and Schot, 2007) i.e. the organisational field for niches such as wave energy and geothermal tend to be small, unstable and in the making, with relatively small relational networks and high capital costs because of economies of scale (Christensen, 1997).

Of the six recent empirical studies on renewable energy, only two researches (Jolly and Raven, 2015; Sarasini, 2013) directly explored the effect of agency on the institutionalisation of new institutional forms. Sarasini (2013) shows that there is a link between structure and agency, with each element recursively influencing the other. While the agency component provides agents with the independence to make their own free

choices (Emirbayer and Mische, 1998), the structural element is the set of recurring patterned arrangements that influence or limit the opportunities and choices available ((Sarasini, 2013). Analysts who hold this view argue that agency is distributed within the structures which actors have created (Emirbayer and Mische, 1998), though the embedded structures do not only generate constraints on agency, they also provide a platform for unfolding entrepreneurial activities (Sarasini, 2013). According to this perspective, actors are knowledgeable agents who possess the capacity to reflect and act in ways other than that prescribed by technological artefacts and taken-for-granted social rules (Emirbayer and Mische, 1998). Put simply, institutions created by actors are social structures which constraint behaviour within an organisational field by serving as "the rules of the game" (North, 1990, p.3). This is primarily because actors in organisational fields tend to be individual agents with dichotomous goal-sets, which makes it difficult for the same rational objectives to be pursued or met (Sarasini, 2013; Selznick, 1948). So, although fundamental institutional changes are required in the set of rules that govern the way things are done in the current energy regime in the UK (Genus, 2012), consideration must be given to the role of agency in the process (DiMaggio, 1988). This view is supported by Sarasini (2013) who argues that although resource dependencies facilitate agency insofar as to enable actors to challenge regulative institutional arrangements, it was not sufficient to dislodge actors' values and beliefs regarding the appropriateness of public policy.

In his paper, Sarasini (2013) asserts that because an agent's action is dependent on cognitive rather than affective processes and structures, the focus should be on rules, cultural accounts, scripts and schemas. This is important because favouring structure over agency can lead to causally deterministic models in which some features of the social world make agency and creativity from human void (Garud *et al*., 2007). This line of inquiry has specific implications for this thesis because it analyses the practice of institutional entrepreneurship through the lens of neoclassical institutionalism, therefore the agency-structure relationship must be considered. This structure-agency debate is often referred to as the paradox of embedded agency (Jolly and Raven, 2015; Walker *et al.*, 2014; Leca *et al.*, 2008; Garud *et al.*, 2007). As Garud *et al.*, (2007, p.9) explain, the dilemma of embedded agency exists because "if actors are embedded in an institutional

field and subject to regulative, normative and cognitive processes that structure their cognitions, define their interests and produce their identities, how are they able to envision new practices and then subsequently get others to adopt them?". Clearly, if actors are to overcome the paradox of embedded agency and become institutional entrepreneurs within the renewable energy subfield in the UK, they must escape this constraint. In spite of this significance, no evidence was found of this inquiry being conducted in the context of the renewable energy subfield in the UK. Some researchers (e.g. Walker *et al.,* 2014; Mutch, 2007) have however attended to this in other research settings and have made some interesting discoveries. For example, Mutch, 2007 and Maguire *et al.,* 2004 have found that despite being constrained by the paradox of embedded agency, some actors overcame this constraint to become institutional entrepreneurs in highly institutionalised fields. This is of relevance to this thesis because the field of energy provision is a highly institutionalised domain (Rohracher, 2008) in which actors in dominant positions tend to exercise power (*ibid*, 2008, p.201).

All the researchers who recently conducted empirical studies on institutional entrepreneurship in the renewable energy subfield recognised the important role of power in either enacting institutional change or maintaining the *status quo*. They therefore attended to this influence but gave it little attention. For instance, in their work, Smink *et al*., (2015) discovered that the incumbents exercised power because of their dominant position in the renewable energy subfield in the Netherlands. The researchers concluded that power enabled the incumbents to be more successful than the new entrants at enacting institutional change because it had provided the agency needed to influence state departments to promote their institutionalisation project (Smink *et al*., 2015). This finding contrasts with that of Jolly and Raven (2015) who ascertained that actors in their empirical setting were involved in shaping their institutional context largely as a result of collective action, rather than as a result of being powerful individuals. Walker *et al.* (2014) however supports Smink *et al.*'s, (2015) thesis by showing that incumbent energy providers in their setting operationalised a "monopolistic" form of power, with some respondents appealing for a more powerful trade association to lobby on their behalf. Sarasini (2013) supports this notion by arguing that companies are key political actors in that they wield considerable power to support/hinder the establishment of policies and legislation that are

key to reducing greenhouse gas emissions. Similarly, Xiangli (2008) identified government departments as powerful organisations which practised as institutional entrepreneurs in the transitioning economy of Western China because of the agency that this position afforded. In their research, Sine *at al*., (2005) found that the two most powerful trade associations, the Independent Energy Producers Association of California (IEPA, founded May 15, 1982) and the Independent Power Producers of New York (IPPNY, founded June 17, 1986), successfully lobbied the state on issues such issues as interconnection with utilities, tax credits, the creation of standard contracts and the formula used to define avoided costs. By capitalising on their position of power, these two trade associations influenced entrepreneurs' technology choices. Collectively, these studies have contributed to the knowledge on power relationships in institutional entrepreneurship research, and in some cases have shown that this played a facilitative role in the creation or maintenance of institutions.

2.4.6 Institutions as Products of Institutional Entrepreneurship

During their inquiries, all six recent empirical studies established that the primary activity of institutional entrepreneurs was to either create or reshape institutions by enacting institutional change, however, each research examined this potential outcome in varying depths. Whereas most (Smink *et al.,* 2015; Jolly and Raven, 2015; Walker *et al.,* 2014; Sarasini, 2013; Xiangli, 2008) only mentioned these structures as part of their theoretical orientation, Sine *et al.,* (2005) examined them more closely. In their study, Sine *et al.,* (2005) found that the development of regulative and cognitive institutions increased the founding rates of all kinds of organisations, which in turn enhanced their legitimacy. The analysts however established that the impact of such institutional development was most pronounced in entrepreneurs founding firms which used "risky new technologies" such as renewable energy (*ibid*, 2005, p.226). As the overall risk level declined, the founding rates of what had been rare types of entrants increased more than the founding rates of what had been common types of entrants, and founding heterogeneity increased (Sine *et al.,* 2005). This contrasted with their finding which shows that the emergence of normative institutions, predominantly created though trade associations, reduced the overall heterogeneity of founding rates. Another important finding of Sine *et al.'s* (2005) research was that the alignment of the regulative, normative and cognitive institutional pillars

affected the founding rates of new firms in that setting. In this regard, they concluded that institutionalisation projects were more likely to succeed if their institutional pillars were appropriately aligned to support each other (*ibid*, 2005, p.226).

Sine *et al.* (2005) have made a useful contribution to institutional entrepreneurship research on renewable energy by investigating how the characteristics of the different institutional pillars affect the institutionalisation of a new organisational form. Nevertheless, their study has a number of caveats. First, the predominantly quantitative design of their research has a number of analytical discrepancies, primarily because renewable energy was relatively embryonic at the time of their inquiry. As Sine *et al.*'s (2005) findings show, many of the institutions they identified had been newly created or reformed, which suggest that very little was previously known about these entities. Yet, they tested hypotheses instead of posing research questions, which suggests they brought their preconceived views of the phenomenon being investigated to their research, instead allowing rich, new information to emerge from the experiences of the occupants of that organisational field (Bryman and Bell, 2011). Second, although quantitative research lends itself to being generalisable to population (Saunders *et al.*, 2009), the researchers limited their analysis to just two states, New York and California. Hence, not only did their research yield very little new insights (Bryman and Bell, 2011), its generalisability to population is questionable. So, although Sine *et al.* (2005) made a valiant attempt at contributing to work on institutional research by investigating the interactions between institutional processes and entrepreneurial action, they left questions such: (1) *"What is the role of the information intermediaries as they relate to the various types of carriers?"* unanswered (Scott, 2003). One of the researchers who provided some insight on this is Xiangli (2008).

In the setting of the Western Regions of China, Xiangli (2008) explored how institutional entrepreneurs might have contributed to the development of the renewable energy industry niche during the transition period. The analyst found that in transition economies, both institution and technology (market) niche co-evolved under the enabling role of institutional entrepreneurs, who take advantage of the enabling aspects of that organisational field, whilst avoiding potential constraints of institutions. In response to the debate on the paradox of embedded agency, Xiangli (2008) concluded that even in the

context of a transitioning economy (which had previously been identified as a constraint to actors), entrepreneurs could play an enabling power to a certain degree.

Xiangli's (2008) study has made a useful contribution to institutional entrepreneurship research by underpinning DiMaggio's (1988) thesis that the primary activity of institutional entrepreneurs is to create or reshape institutions to achieve interests they value highly. It has also usefully shown that it is possible to overcome the constraint of being embedded agents in organisational fields fraught with constraints. Despite these valuable contributions, Xiangli's (2008) research has a number of methodological discrepancies. Most apparently, its over-reliance on secondary data. By so doing, the study has unearthed very little new information and the credibility of the data used for its analysis may be questionable due to being "second-hand" information (Bryman and Bell, 2011). Although the other researchers may have attended less to the institutions created by the institutional entrepreneurs, their more robust methodological approaches have provided more credible insights on this.

In their research, Smink *et al*., (2015) found that formal institutions are set by the Ministry of Economic Affairs and implemented by its executive branch, the Netherlands Enterprise Agency (NEA). They also established that the changes which occurred in the formal institutional framework for biomethane mostly related to financial support, regulatory support and government statements which indicated the prioritisation of biomethane (*ibid,* 2015, p.7). Smink *et al*., (2015) concluded that the incumbent energy providers were more effective in influencing institutions because they lobbied, collaborated and theorised more appropriately than new field entrants. In his study, Sarasini (2013) found that corporate political action (CPA) was driven primarily by the need to manage external resource dependencies and that where risks were more acute, companies were more likely to seek to disrupt regulative institutions. He also established that respondents' appraisals of policy instruments are based on a convergent set of shared values (cognitive institutions) that form the basis of CPA and which actors do not seek to disrupt, despite resource-based risks (Sarasini, 2013). CPA was thus characterised as a means of transmuting cognitively held values and beliefs into regulative institutions (*ibid,* 2013, p.488). Jolly and Raven (2015) posit that institutional entrepreneurs might not necessarily always proactively transform institutions through purposeful action, but

instead sometimes reactively act on opportunities presented to them from a novel innovation. Walker *et al.*, (2015) reported that institutional entrepreneurs successfully implemented new ideas in new organisations in new markets, however, failed to label these new organisational entities as institutions. Although this group of researchers examined institutions in varying depths, a common thread across their work was that the newly created or restructured institutions must gain legitimacy in order to become institutionalised.

2.4.7 Gaining Legitimacy in the Renewable Energy subfield

As explained in section 2.2, it is essential that institutional entrepreneurs and their activities gain legitimacy in their social environments as this provides them with the social acceptance and credibility they need to survive and thrive (Suchman, 1995). This is because legitimacy is the "generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (*ibid*, 1995, p.574). In recognition of this, all recent empirical studies investigated how legitimacy was gained in the various research settings, however, this varied in extents. In their study, Walker *et al.* (2014) found that institutional entrepreneurs in the solar industry in Ontario gained legitimacy through innovation and ingenuity strategies. In addition to describing the mechanisms deployed to gain legitimacy, Walker *et al* (2014) aggregated it into four broad categories- regulative, moral, cognitive and pragmatic legitimacy.

In Walker *et al.'s* (2014) conceptualisation of legitimacy, regulative legitimacy represents acceptability to the procedures and rules of authoritative bodies such as the state and is thus indicative of a top-down constraint (*ibid,* 2014, p.7). The moral and cognitive dimensions are like Suchman's (1995) formulation i.e. moral legitimacy asks: "*what's in it for society*?" While pragmatic legitimacy asks: "*what's in for me*?" Walker *et al.* (2014) found that regulative legitimacy was gained through measures such as the Green Energy Act (GEA) providing the legal permission for the solar energy industry in Ontario as this allowed for the emergence of renewable energy in the state. The analysts found that theorisation played a key role in the process because it allowed moral legitimacy to be obtained through solar energy being portrayed as a clean and renewable

source of energy which provided societal benefits such as the reduction of greenhouse gases emissions and a reduction in the dependency on fossil fuels (*ibid,* 2014, p.15).

Similarly, pragmatic legitimacy was gained through the solar industry creating jobs in areas affected by a decline in the automobile industry, the provision of electricity from solar panels and through political issues such as renewable energy having a role in the re-election of the government (*ibid*, 2014, p.14). Cognitive legitimacy was gained through the desire and ability for renewable energy to provide seven per cent of the power to the Ontario electric distribution system, a mechanism initiated by the GEA. Walker *et al.* (2014) also noticed that some new renewable energy products gained their legitimacy by not relying on subsidies. In concluding, the researchers surmised that firms can circumnavigate top-down institutional constraints ingeniously and legitimately, however, this should be maintained to increase their chance of survival (Walker *et al.,* 2014).

Jolly and Raven (2015) found that theorisation enabled institutional entrepreneurs in the Indian wind industry to gain legitimacy through two aggregated strategies- supportive techno-economic and socio-political networks and an indigenous innovation infrastructure. Having conducted their study to analyse the sector across three-time periods (1985–1995, 1995–2003, and 2003–2013), the researchers observed that the degree of legitimacy varied accordingly (*ibid,* 2014, p. 1003). During the first time period, the industry had a low level of legitimacy because major issues such as the feed-in-tariffs being paid by the state electricity board; negotiations of grid access and cost; and other delegitimising factors (Suchman, 1995). During the second time period, legitimacy remained relatively low due to issues such as maintaining grid discipline; high fees charged by electricity boards for reactive power; the integration of wind energy into weak grids; *inter alia*. During the third-time period, although issues such as local communities being excluded from wind farm planning; the removal of some government incentives and cost burdens on consumers also impacted on the legitimacy of the technology.

In their study, Sine *et al* (2005) determined that certification brought the firms legitimacy, but whereas it helped nascent entrepreneurs in the face of negative press, it was less helpful in positive press. The researchers reasoned that legitimating processes in the energy sector not only operate at the firm level but also at a sector level. Sine *et al* (2005) noted that cognitive and socio-political legitimacy facilitated start-up by easing the

acquisition of the necessary resources. Sine *et al* (2005) concluded that the first few years of a new sector represent a distinctive phase in its lifecycle and can have a lasting impact on its evolution. Thus, strategic legitimising actions can mitigate the uncertainty that surrounds new ventures in new sectors (*ibid*, 2005, p.208).

In the setting of the UK, Provance *et al.* (2011) found that entrepreneurs gained legitimacy within the microgeneration sector by creating actions that generated legitimacy in the minds of their stakeholders. In this case, through compliance and regulatory adherence; technological research and development (R&D); marketing; product design; customer relationships and appropriate business models (*ibid*, 2011, p.5635). This finding corroborates other studies (e.g. Hardy and Maguire, 2008; Zilber,2007) by demonstrating that institutional entrepreneurship is largely a discursive strategy that involves the generation of texts and discourse aimed at affecting the underlying social construct of institutions. For instance, when using discursive intervention to communicate and create legitimacy for new practices, institutional entrepreneurs co-opt rather than confront opponents to avoid resistance and conflict (Hardy and Maguire, 2008).

In his study, Xiangli (2008) established that renewable energy companies gained legitimacy through technological standards. This was primarily attributed to standards being the rules of engagement that dictated how the various components of technological systems combine to provide utility to end-users. Since technological fields represent the pattern of relationships between humans and objects related to product-market domain (Geels and Schot, 2007), the researcher found that they were shaped by the same institutional environments in which they were embedded (Xiangli, 2008). Since technological standards guide the activities and behaviour of individuals and organisations in acts of entrepreneurship (Hwang and Powell, 2005), they were a means of gaining legitimacy in that empirical setting (Xiangli, 2008).

Considered together, the studies on institutional entrepreneurship in the renewable energy subfield have not sufficiently attended to important aspects of legitimacy such as its origin; extent; means of conferring; antecedents and potential consequences. This is a notable failing because studies conducted elsewhere (e.g. Demil and Bensédrine, 2005; Suchman, 1995) have shown that these are important factors. Another caveat of the recent empirical studies is their failure to provide a suitable benchmark for measuring legitimacy.

As Suchman (1995) usefully points out, legitimacy is subjective rather than objective therefore consideration must be given to "*legitimacy for what*?" Researchers should therefore identify the source(s) of legitimacy in institutional analysis. Finally, the recent empirical studies have portrayed legitimacy as being static rather than a fluid characteristic, unlike researchers such as Markard *et al*., (2016) who have successfully demonstrated that legitimacy may change over time due to factors such as the misalignment of institutions. Given this, the next subsection summarises the salient findings of the review of the recent empirical studies to highlight their significance for the undertaking of this thesis.

2.4.8 Summary

This section has reviewed the recent empirical institutional entrepreneurship research on renewable energy in general. It began by conducting a literature search, which established that institutional entrepreneurship research had been conducted in a number of empirical settings, however, none was carried out in relation to the UK. This is a significant gap, because the review of recent empirical works shows that the process of institutional entrepreneurship has been instrumental in shaping renewable energy subfields in the following six empirical settings: (1) the wind power sub-community in India (Jolly and Raven, 2015); (2) the biogas sub-community in the Netherlands (Smink *et al.*, 2015); (3) the solar sub-community in Ontario, Canada (Walker *et al.*, 2014); (4) the electricity sub-community in Sweden (Sarasini, 2013); (5) the renewable energy subfield in the Western Regions of China (Xiangli, 2008); and (6) the independent power sector in New York and California (Sine *et al*.,2005).

Six main themes were aligned to the review of the empirical literature: (1) organisational fields as fertile ground for institutional entrepreneurship; (2) the conditions in those fields which triggered or discouraged institutional entrepreneurship; (3) how intervention strategies were deployed by actors in organisational fields; (4) the role of agency, power and interests in enabling or hindering institutional change; (5) institutions as products of institutional entrepreneurship; and (6) how legitimacy was gained in the renewable energy subfields in those empirical settings. While these studies have usefully demonstrated that institutional entrepreneurship research is appropriate for examining the renewable energy subfield, generally, they have not attended to the many of its core

principles. Consequent to this, a number of gaps in knowledge remain unfilled, as the next section shows.

2.5 GAPS IN KNOWLEDGE

This subsection discusses the gaps in knowledge. It is based on the review of the recent empirical studies which found that there are four significant gaps:

1. *Researchers have not analysed on the basis of primary data the role of institutional entrepreneurs in shaping the renewable energy subfield in the UK.*

This represents a major gap in the literature because the lack of empirical data has translated to a dearth of knowledge about how the renewable energy subfield might have evolved over the past thirty years or so, and if it has, the actors behind those changes. This has implications for the renewable energy subfield in the UK because research in other empirical settings (Jolly and Raven, 2015; Smink *et al.,* 2015; Walker *et al.,* 2014; Sarasini, 2013; Xiangli, 2008; Sine *et al.,* 2005) has shown that institutional entrepreneurs have enacted field-level institutional change in those fields. Filling this gap therefore provides new insights on institutional entrepreneurship in the context of the renewable energy subfield in the UK. For example, identifying the actors responsible for enacting or hindering institutional change.

2. *Investigation into the enabling conditions which serve as catalysts for institutional entrepreneurship in the renewable energy subfield in the UK remains largely underexplored.*

This gap in knowledge translates to a number of shortcomings. First, from a historical standpoint, failure to identify the antecedents which might have initially triggered institutional entrepreneurship may result in an incomplete inquiry being conducted. This is because eminent institutional theorists (e.g. Battilana *et al.,* 2009; Greenwood *et al.,* 2002; DiMaggio, 1988) have shown that enabling conditions are the factors which initiate institutional entrepreneurship. Second, researchers are yet to consider the existential factors which trigger or deter institutional entrepreneurship. Filling this gap therefore provides insights on the factors which may trigger, or have triggered the practice of institutional entrepreneurship.

3. *Researchers have failed to investigate on the basis of empirical data how some actors might have overcome the constraint of being embedded agents to become institutional entrepreneurs in the renewable energy subfield in the UK.*

The lack of research on this aspect indicates that very little is known about how actors, operating as institutional entrepreneurs in the renewable energy subfield in the UK, might have enacted institutional change, despite being constrained by existing institutional arrangements. By filling this gap, this thesis provides fresh insights on how some actors might have, or are able to overcome those constraints to practise as institutional entrepreneurs.

4. *The manner in which institutional entrepreneurs might have gained legitimacy in the renewable energy subfield in the UK remains underexplored.*

The scarcity of empirical data on how some actors might have gained legitimacy in the renewable energy subfield in the UK represents a major gap in knowledge because this suggests that very little is known about how institutional entrepreneurs might have made their actions seem proper, desirable and/or appropriate within the socially constructed norms of the field of energy provision in the UK. By therefore filling this gap, this thesis sheds light on how some renewable energy practitioners might have, and are able to, increase their chance of surviving in this field.

The literature review also determined that mainly two types of inquiries (actor-centric and process-centric approaches) have been conducted on institutional entrepreneurship in the renewable energy subfield. This dichotomous approach can be problematic because whereas the former paints a neat, functionalist picture of the practice, the latter focuses too much on process (Hardy and Maguire, 2008). This lopsided approach is likely to paint an incomplete picture of the phenomenon being investigated. By taking a more comprehensive approach, this thesis aims to provide fresh insights into the practice of institutional entrepreneurship in the renewable energy subfield in the UK during the period 1986-2016. Considered together, closing these gaps would make a significant contribution to knowledge, therefore the next section proposes a theoretical framework to try and make progress with this.

2.6 TOWARD A THEORETICAL FRAMEWORK FOR EXAMINING INSTITUTIONAL ENTREPRENEURSHIP

This section provides a theoretical framework for analysing institutional entrepreneurship in the renewable energy subfield in the UK.

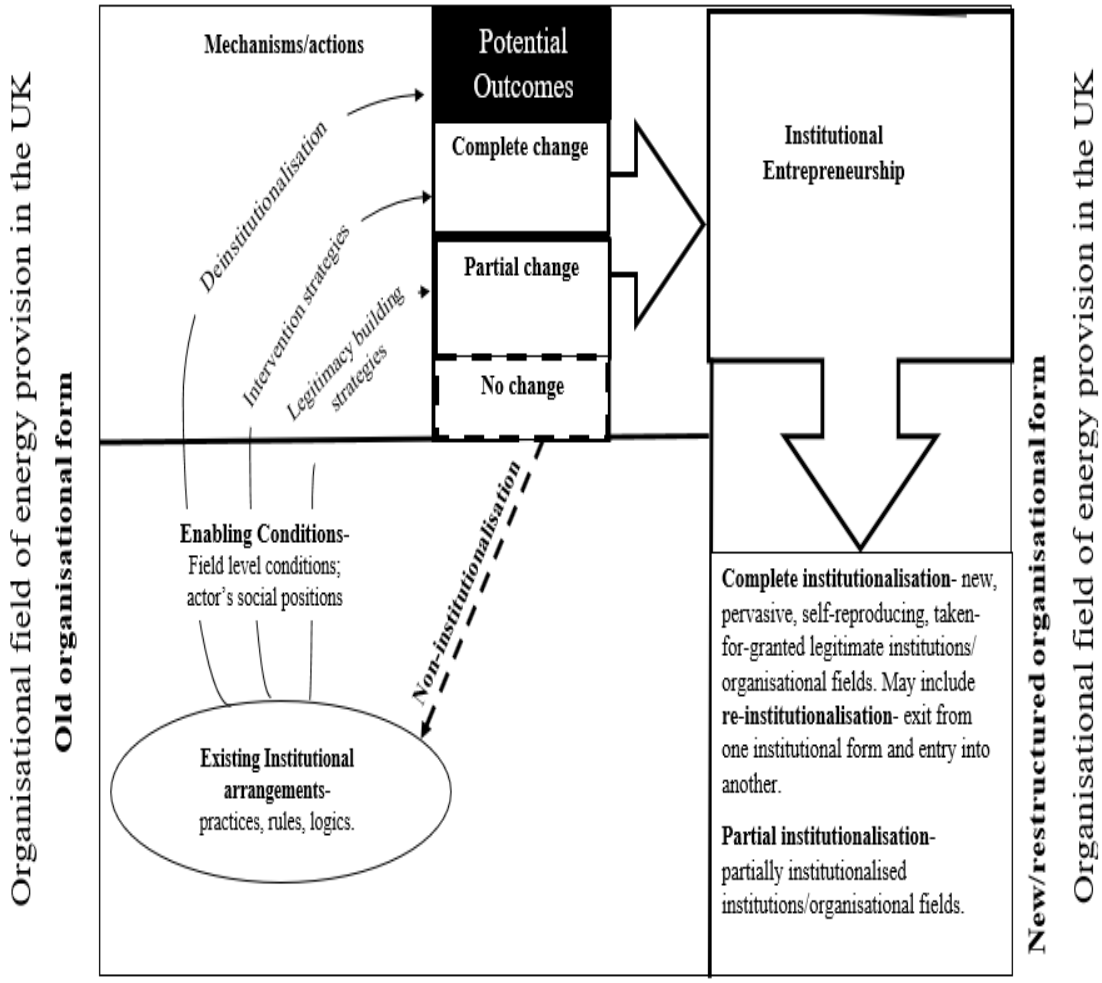

Figure 1: A Framework toward Investigating Institutional Entrepreneurship in the Renewable Energy Subfield in the UK

As Figure 1 shows, the process of institutional entrepreneurship is typically triggered by enabling conditions (*curved arrow*) because some actors are motivated to engage in "collective action to reconstruct" (Hardy and Maguire, 2008, p.204) organisational fields (DiMaggio, 1991; DiMaggio and Powell, 1983). Organisational fields are insightful units of observation because they are the institutional environments in which institutional entrepreneurship occurs (DiMaggio, 1991, 1988). Since there is broad disagreement as to

exactly what constitutes an organisational field, examining this sphere may contribute to settling that debate. In a similar way, enabling conditions are useful indicators because they are the rules which facilitate, support and supplement institutions (Lawrence and Suddaby, 2006). Prevailing literature suggests that there are two broad categories of enabling conditions, field-level conditions and actors' social positions (Battilana *et al*., 2009). Whereas field-level conditions are the jolts, crises and internal contradictions which disturb the socially constructed field-level consensus (Greenwood *et al*., 2002; Fligstein, 1997), actors' social positions are the situations of actors in organisational fields which dictate how they relate to their social settings (Battilana *et al.*, 2009; Emirbayer, 1997). Some actors relate to these social settings by triggering institutional entrepreneurship to achieve their vested interests (DiMaggio, 1988).

These actors, referred to as institutional entrepreneurs (Hardy and Maguire, 2008; DiMaggio, 1988), use intervention and legitimising strategies such as discourse (e.g. framing, theorising, text; etc.) and deinstitutionalisation to either create new institutions (DiMaggio, 1988) or maintain existing ones (Lawrence and Suddaby, 2006). Institutional entrepreneurs are key objects of analysis because they are the actors who change or reform existing institutional arrangements in organisational fields (DiMaggio, 1988), the main area of interest for this thesis. It is also important that institutional entrepreneurs are observed because they are the enactors of institutional change (Hardy and Lawrence, 2008; Greenwood *et al*, 2002; DiMaggio, 1988).

As the model shows, institutional entrepreneurs change existing institutional arrangements by using mechanisms such as theorisation (Greenwood *et al*, 2002) and other strategies to deinstitutionalise (undo) prevailing institutions. Institutions are key units of analysis because they are the structures (Giddens, 1984) which bring order and stability to social life (Scott, 2001). They can be recognised if they are organised, established (MacIver, 1931) recurring patterns of behaviour (Huntingdon, 1965) and may either be formal or informal (North, 1990). Formal institutions are codified in law and may be entities such as regulations and legislation, while informal institutions are the less obvious, usually unwritten social customs, norms and traditions which shape behaviour and thought (North, 1990).

Institutionalisation projects either succeed (re-institutionalisation) or fail (non-institutionalisation). Re-institutionalised entities are recognisable if they had exited from one institutionalisation and entered into another institutional form (Jepperson, 1991), while those which are non-institutionalised can be distinguished if they maintain the original rules, norms and scripts (Greenwood *et al*., 2002). There are several reasons why some institutionalisation projects fail. First, powerful actors often use blocking strategies to hinder the creation of new organisational forms or hinder the transformation of existing practices, rules or logics (Sarasini, 2013; Lawrence, 2008). Second, some actors suffer from the paradox of being embedded agents (Walker *et al.*, 2014; Mutch, 2007). To overcome this constraint, institutional entrepreneurs draw on mechanisms such power (Lawrence, 2008; Khan *et al.,* 2007; Fligstein, 2001a) and agency (Garud *et al.,* 2007; Fligstein, 2001a; DiMaggio, 1988) to try and influence others to adopt their institutionalisation projects (DiMaggio, 1988).

As Figure 1 shows, one potential outcome of an institutionalisation project is the occurrence of institutional entrepreneurship. Institutional entrepreneurship is a viable unit of observation because it represents the activities of actors who have interests in particular institutional arrangements and leverage resources to create new institutions or transform existing ones (Maguire *et al*., 2004; DiMaggio, 1988). This outcome can be recognised if the entity displays the characteristics of permanence; being self-reproducing, pervasive and taken for granted (Dacin and Dacin, 2008; Zucker, 1977). However, not only must the newly created or reform institutions (and the institutional entrepreneurs) acquire the status of being institutionalised, they must gain legitimacy (Walker *et al*., 2014; Suchman, 1995). It is important that legitimacy is investigated because it provides institutional entrepreneurs with the social acceptance and credibility they need to survive and thrive in an organisational field (Dacin *et al*., 2002). It can be recognised in the field if the actions of an organisational entity are regarded as acceptable; appropriate and desirable (Suchman, 1995). The degree of legitimacy of an institution can also be ascertained if it is legally sanctioned (regulative); morally governed (normative) and culturally or conceptually correct (normative) (Scott, 2001).

The new institutional form (typically practices, rules, logics) may attain one of two statuses- fully institutionalised or partially institutionalised (Genus, 2012; Jepperson,

1991). Fully institutionalised entities can be identified if they are considered the norm and are widely accepted without being questioned about factors such as efficiency and cost (Genus, 2012; Suchman, 1995; Jepperson, 1991). Full institutionalisation may occur through re-institutionalisation, a process which is recognisable if organisational entity exits one institutional form and enters into another (Jepperson, 1991). Partially institutionalised entities are important units of analysis because they have the properties of being malleable; unorganised and unstructured, and can be recognised in the field if their strength to create and institutionalise new rules is moderate (Genus, 2012).

2.7 SUMMARY

This chapter reviewed relevant literature pertaining to the thesis topic: *"Institutional Entrepreneurship in the Renewable Energy Subfield in the UK, 1986-2016"*. It began by disclosing that it is divided into two sections, section 2.2 which provides a theoretical base for the thesis, and section 2.3 which reviews recent empirical institutional entrepreneurship research on renewable energy. Section 2.2 shows that institutional entrepreneurship theory is a branch of neo-institutionalism that belongs to the overarching academic field of institutional theory, an approach that focuses on examining the stability and change of institutions. Relatedly, institutional entrepreneurship theory reintroduces actor' agency into institutional change. Section 2.2 also revealed that the main units of analysis for institutional entrepreneurship research are organisational fields; institutions; enabling conditions; institutional entrepreneurs; institutional change; institutional logics; power; agency and legitimacy

Section 2.3 conducted a search for recent empirical institutional entrepreneurship studies on renewable energy and found that six studies had been conducted worldwide: Jolly and Raven, 2015; Smink *et al*., 2015; Walker *et al*., 2014; Sarasini, 2013; Xiangli, 2008 and Sine *et al*.,2005. None of these studies was in the setting of the UK. Despite demonstrating that institutional entrepreneurship theory is appropriate for examining the dynamics within the renewable energy subfield, these studies did not attend to some of its core principles, consequently, there were four significant gaps in knowledge. To fill these gaps, the chapter developed a theoretical framework for analysing institutional entrepreneurship in the renewable energy subfield in the UK.

The framework proposes that institutional entrepreneurship occurs in institutional environments referred to as organisational fields. Enabling conditions within the field either motivate or demotivate actors from trying to change existing institutional arrangements. In order to try and reshape the field, actors employ intervention strategies such as theorising and framing. Sometimes they succeed, sometimes they fail. Often, their fate is decided by their power and agency, either way, they must gain legitimacy. Legitimacy is the general belief that the actions of an organisational entity are acceptable; appropriate and desirable. If the new or reformed institution displays the characteristics of permanence; self-reproduction, pervasiveness and taken-for-grantedness, institutional change would have been deemed to have taken place and the responsible agent would have earned the right to be called an institutional entrepreneur. Having devised an appropriate theoretical framework for analysing institutional entrepreneurship in the renewable energy subfield in the UK in this chapter, the next chapter discusses the methodological framework used to conduct the inquiry.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

The purpose of this thesis is to investigate what role institutional entrepreneurs may have played in shaping the renewable energy subfield in the UK during the period 1986-2016. In order to achieve this, a literature review was first conducted to identify the significant gaps in knowledge. The identification of those gaps enabled the formulation of a set of research questions, and those questions largely dictated the choice of research methods used to conduct the enquiry (Creswell, 2013). The research questions are:

1. *"How might have institutional entrepreneurs shaped the renewable energy subfield in the UK during the period 1986-2016 and what impact may this have had on the field of energy provision?"*
2. *"What conditions may have facilitated or hindered the shaping of the renewable energy subfield in the UK during the period 1986-2016?"*
3. *"How might have institutional entrepreneurs gained legitimacy for themselves and their activities and what effect may this have had on the renewable energy subfield gaining legitimacy?"*

This chapter sets out the procedural rules used to collect, evaluate and validate the knowledge acquired to answer those research questions (Sekaran and Bougie, 2013). It is organised as follows. After the introduction, section 3.2 discusses the philosophical assumptions which underlie this thesis. Section 3.3 describes the research design. Section 3.4 presents the plan of action taken for conducting the inquiry, while section 3.5 explains how the evidence was gathered. Section 3.6 critiques the approach taken for gathering the data. Section 3.7 identifies the timeframe within which the inquiry was conducted, while section 3.8 describes the approach taken for data analysis. Section 3.9 explains how the thesis achieved an acceptable level of integrity and section 3.10 sums up the chapter with some conclusions.

3.2 PHILOSOPHICAL ASSUMPTIONS

When scientific research is being conducted, it is important that the philosophical assumptions which underpin the study are explicitly stated as these beliefs influence the manner in which the information is collected, analysed and interpreted (Creswell, 2013; Lincoln *et al.,* 2011). The three broad philosophical assumptions which underpin such researches are epistemological, ontological and axiological in nature (Creswell, 2013).

The manner in which these beliefs influence this thesis is described in the subsections that follow.

3.2.1 Epistemology

Epistemology concerns the assumptions about knowledge and how it can be obtained (Creswell, 2013; Bryman and Bell, 2011). There are four broad epistemological positions: realism; positivism; pragmatism and interpretivism (Saunders *et al.*, 2009). Whereas an interpretivist perspective posits that social reality is socially constructed (Rowlands, 2005), positivism holds that the purpose of theory is to generate hypothesis which can be tested (Bryman and Bell, 2011). Pragmatists believe that knowledge claims arise out of situations, actions and consequences (Gray, 2014; Creswell, 2013), while realists commit to the belief that there is an external reality that is separate from our description of it (Bryman and Bell, 2011). This thesis is underpinned by an interpretivist philosophical perspective (after Weber, 1947).

An interpretivist philosophical position is assumed for this thesis because it facilitated an understanding of the underexplored renewable energy subfield the UK (Schutt, 2011; James and Busher, 2009) based on an interpretation of the subjective views of its constituents. As established by the literature review, previous scholarly work on the subfield have researched different contexts, therefore an approach had to be taken to generate theory (Bryman and Bell, 2011). Not only was this necessary because of a lack of existing data, but also due to the present researcher's belief that knowledge is not theory-free (Smith, 2008). Since institutional entrepreneurship is largely a collaborative practice involving institutional entrepreneurs enacting institutional change (DiMaggio, 1988), a theory of action is implied. Interpretivism allows for understanding this type of organisational action (Rowlands, 2005) because human beings think and reflect (Schutt, 2011; James and Busher, 2009; Rowlands, 2005) to influence their social order (Weber, 1948). Interpretivism facilitates a deep understanding of this organisational interplay as it draws on the subjective views of those immersed within such institutional settings (Gray, 2014), unlike critical realism which holds that we can only gain knowledge by using purely scientific methods to uncover causal mechanisms (Bhaskar, 1989).

By assuming an interpretivist position, this thesis is guided by six key principles: hermeneutics; contextualisation; interaction between myself and the research subjects;

dialogical reasoning; multiple interpretations and suspicion (Klein and Myers, 1999). Since it is guided by these principles, the thesis is able to study the intricacies associated with how the renewable energy subfield in the UK evolved over the past three decades (Bryman and Bell, 2011), despite a lack of previous knowledge about the phenomenon. Nevertheless, taking this subjectivist position may have allowed for the introduction of bias into the thesis (Schutt, 2011). It is also recognised that this stance is subject to the criticisms of pragmatists and positivists who may argue that facts can only be proven through quantitative and other similar methods (Boghossian, 2006). Although these are plausible arguments, if the knowledge obtained is credible, it is more likely to be accepted as a fact (Bryman and Bell, 2011). Ontology considers what constitutes a fact, as the next section explains.

3.2.2 Ontology

Ontology is concerned with the nature of being (Creswell, 2013), in other words, the nature of reality (Bryman and Bell, 2011). There are three broad ontological positions, objectivism, constructionism and critical realism (*ibid*, 2011, p.20). While objectivists believe that social phenomena and their meanings have an existence that is independent of social actors (*ibid*, 2011, p.21), constructionists posit that social phenomena and their meanings are continually being accomplished by social actors (Lincoln *et al*., 2011). In stark contrast, critical realists hold that much of our reality exists and operates independently of our awareness or knowledge (Sayer, 2000) and there is very little that we can do to change or influence this (Bhaskar, 1975). In keeping with the interpretivist tradition that underpins this research, this thesis assumes a constructionist ontological position. Having taken a constructionist ontological stance, the main assumptions being made are that there are no absolute truths out there (Baghramian, 2004) and that reality is constructed inter-subjectively through the understandings and meanings acquired socially and experientially (Gray, 2014).

A constructionist ontological position has been assumed for this thesis because the central premise of institutional entrepreneurship theory is that actors shape the organisational fields in which they are embedded and are in turn reflexively shaped by those same environments (DiMaggio, 1988). This suggests that social domains are largely constructed by the actions of individuals and/or organisations, instead of being void of

their intervention as eminent objectivists such as Sayer (2000) hold. This is because the outcome of institutional change is largely the outcome of a human intervention, which suggests that a constructionist posture is appropriate for this thesis as it facilitates an understanding of how actors shape their social settings (Bryman and Bell, 2011). By so doing, the goal of this thesis was to rely primarily on the participants' subjective views of how the renewable energy subfield to which they are connected might have been shaped by individuals and organisations, and the effect this might have had on its overarching field of energy provision (Creswell, 2013). To facilitate this, the questions asked during the interviews were broad and general to evoke the informants' subjective views (*ibid*, 2013, p.8), rather than implanting preconceived ideas (Saunders *et al*. 2009) as deductive studies do by offering propositions. It is however recognised that objectivists can reasonably argue that constructionism is too subjective (Alvesson and Sköldberg, 2009), therefore the next section explains how the present researcher decided on the most appropriate approach for conducting this inquiry.

3.2. 3 Axiology

Axiology concerns the philosophy of values (Hiles, 2008). It posits that science and technology is a social activity governed by various norms and values (Saarni *et al.,* 2011). For that reason, axiology focuses on ascertaining how researchers' own values influence the various stages of their researches (Saunders *et al*., 2009) as this tends to influence how they conduct their inquiries (Hiles, 2008). In simple terms, axiology primarily refers to the "aims" of the research (Lee and Lings, 2008) and focuses on what researchers value in their studies (Saarni *et al.,* 2011) and findings (Hiles, 2008).

The axiology of research is defined by its epistemological position (Saunders *et al*., 2009). If a positivist approach is taken, research is conducted in a value-free way with the researcher assuming an objective stance (Carnaghan, 2013). With this approach, research is highly structured, with large samples being used to collect the data (Saunders *et al*., 2009). The axiology of realism research contrasts by being value-laden, with the researcher being biased by cultural experiences, world views and upbringings (Carnaghan, 2013). With this research philosophy, the method chosen to collect the data must therefore fit the subject matter (Saunders *et al*., 2009). In the case of research underpinned by pragmatism, values play a major role in interpreting the results, with the researcher

adopting both objective and subjective points of view (Carnaghan, 2013). Popular data collection methods for this philosophy are mixed or multiple method designs and the design may be either quantitative or qualitative (Saunders *et al*., 2009). Since this thesis adopts an interpretivist epistemological position, it axiology is value bound because the present researcher is part of what is being researched, cannot be separated from it and has to be subjective (Lee and Lings, 2008). As such, the next section elaborates on the method(s) used to collect the data.

3.3 COLLECTING THE EVIDENCE

In addition to the philosophical assumptions which underpin a doctoral thesis, the credibility of its findings are largely dependent on the suitability of the data collected to answer the research question(s) (Holliday, 2007). Given the importance of this requirement, the next sections explain the measures undertaken by this doctoral thesis to achieve this.

3.3.1 Research Approaches

The three main approaches for conducting scientific research are quantitative research, qualitative research and mixed methods research (Saunders *et al.,* 2009). Whereas quantitative research is concerned with applying measurement procedures to social life (Babbie, 2015), qualitative studies explore and seek to understand "the meaning individuals or groups ascribe to a social or human problem" (*ibid,* 2013, p.4). Mixed methods research combines both approaches (Saunders *et al.,* 2009). In keeping with the interpretivist philosophy which underpins this thesis, a qualitative approach was adopted for this inquiry.

A qualitative approach has been chosen for this thesis because of its suitability for investigating a problem or issue that needs to be explored (Cresswell, 2013). It is however recognised that because qualitative research typically lacks generalisability (Bryman and Bell, 2011), the thesis may be criticised for claiming that its findings are generalisable to the entire UK setting. Here, it is being stressed that the aim of this thesis is not to generalise to population, but instead to theory (*ibid,* 2011, p.411). For that reason, the present author believes that a qualitative approach is appropriate because it allows for seeing the phenomenon through the eyes of the participants recruited from the field of energy provision in the UK (Bryman and Bell, 2011).

The general approach for studying reality (empiricism) takes one of two directions: deduction or induction (Bryman and Bell, 2011). Whereas a deductive approach first deduces theory and then tests it to draw conclusions (top-down approach), an inductive approach collects primary data from which it detects patterns and regularities to develop theories or general conclusions (*ibid*, 2011, p. 11; Lincoln and Guba, 1985). This thesis draws on inductive reasoning to make sense of the data because very little was known about the phenomenon being investigated (Creswell, 2013), instead of a "top-down" deductive approach being used to test theory. An inductive approach also fits with the overall strategy taken for the thesis (Bryman and Bell, 2011). In other words, the research design (Maxwell, 2012).

3.3.2 Research Design

Research design is the set of methods and procedures used to collect and analyse the variables specific to a research problem (Maxwell, 2012). There are three broad categories of research design: exploratory, descriptive and explanatory studies (Bhattacherjee, 2012). While an exploratory research design is generally conducted in new areas of inquiry; descriptive research is aimed at making careful observations and detailed documentation of a phenomenon of interest (*ibid,* 2012, p.6). Explanatory research aims to explain, rather than describe the phenomenon studied (Maxwell, 2012). This thesis utilised an exploratory qualitative research design to generate theory (Schutt, 2011) about institutional entrepreneurship in the renewable energy subfield in the UK. Its main aims are to diagnose the practice; identify its boundaries and classify the salient factors which are of relevance to answering the research questions (Stebbins, 2001). The design is inspired by the contextualistic approach (Walsham, 1993) which links context, content and process concerning change and transformation (Pettigrew, 1987). In this case, the context is institutional entrepreneurship in the renewable energy subfield in the UK, however, because the area was previously unexplored, there was limited empirical data on the topic. Given this, the theoretical framework developed by the literature review served as an initial guideline for the research context, but this was further developed as the study unfolded (Stebbins, 2001). Changes in context refer to the institutionalisation of the renewable energy subfield during the period 1986-2016.

An exploratory research design was chosen for this thesis because the thesis topic had been previously unexplored, therefore it was prudent to find out what had happened in the little-understood phenomenon of the institutionalisation of renewable energy in the UK during the period (Hesse-Bider and Leavy, 2011). By so doing, this thesis analysed the phenomenon in a new light by employing institutional entrepreneurship theory; provides fresh insights which facilitate a better understanding of the problem and generates new ideas for future research (Robson, 2002). This design was also chosen because its flexibility allowed for its refinement as the study unfolded (Schutt, 2011). Contrariwise, some scholars might argue that due to the nature of exploratory research, conclusions should be drawn with caution (Babbie, 2015). Given the extent of criticism aimed at this research design, the next section describes the strategy used to ensure that these constraints were overcome.

3. 4 RESEARCH STRATEGY

Saunders *et al.* (2009) describe research strategy as a general plan of action that helps the researcher answer the research questions in a systematic way. They qualify this by identifying seven strategies commonly used for conducting scientific research: experiment; survey; case study; action research; grounded theory; ethnography and archival research (*ibid*, 2009, p.141). This thesis utilised a case study research as the overarching strategy for answering the research questions. A case study research is a "detailed and intensive analysis of a single case" (Bryman and Bell, 2011, p.59). Lincoln and Guba (1985) describe three types of case study researches: factual; interpretive and evaluative. Since this thesis drew largely on the informants' views to answer the research questions, an interpretive case study was that conducted for this inquiry (Zucker, 2009).

Yin (2009) asserts that a case study design must have a minimum of five components: (1) the research question(s); (2) its propositions; (3) its unit(s) of analysis; (4) a determination of how the data are linked to the propositions; and (5) the criteria for interpreting the findings. Acting on Yin's (2009) advice, the case study utilised for this thesis was designed to satisfy these requirements. Research questions classify what researchers want to understand about the problem that led to their study (Sandelowski, 2008). Whereas research questions posed by quantitative studies tend to restrict researchers to the variables that will be addressed, those in qualitative inquiries are broad

enough to facilitate new discoveries (*ibid,* 2008, p.786). For qualitative studies, Creswell (2013) suggests that after stating the research problem, the inquirer should ask several open-ended research questions, gather multiple forms of data to answer those questions and make sense of the gathered data by grouping them into codes, themes or categories.

As section 3.1 shows, this thesis poses three open-ended research questions to facilitate a more accurate depiction of individual's "mental maps" or cultural understanding (Fetterman, 2008). This is achieved by posing *"how"* and *"what"* questions to encourage participants to express their own views freely (Yin, 2009), rather than closed questions such as *"how many"* or *"how much"* which tend to confine respondents to providing short, direct responses (Bryman and Bell, 2011). The research questions posed by this thesis are consistent with the exploratory case study strategy employed to discover more about a single unexplored case as they enable the building of theory (Yin, 2009). For this thesis, the single case is the renewable energy subfield in the UK, a part of the broader field of energy provision. As Yin (2009) reminds us, if the topic is exploratory in nature, this is a legitimate reason for not having a proposition. As explained in section 3.3.2, this is an exploratory research because previous scholarly work had focused on different contexts, therefore an inductive approach was taken to generate theory about an underexplored area (Bryman and Bell, 2011; Lincoln and Guba, 1985). Given this, the single, exploratory case study undertaken for this thesis does not have a proposition.

The primary units of observations for this case study were the renewable energy subfield in the UK and the organisational field of energy provision within which it is embedded. These were the primary units of observation because as established by the literature review, institutional entrepreneurship generally occurs in local social orders referred to as organisational fields (Fligstein, 2001a) and the purpose of this thesis is to examine that phenomenon. The central units of analysis are the structures; actors (individuals and organisations); actions; culture and cognition connected to the renewable energy subfield in the UK. Structures include entities such institutions; organisational fields; enabling conditions; institutional constraints; outcomes; legitimacy; *inter alia*. Actors included individuals and organisations belonging to the field of energy provision in the UK. The activities of these actors were also analysed.

The lists of structures and actors are not exhaustive because as explained in the preceding section, an organisational field is a subjectively constructed domain (Hoffman, 1999), hence it is difficult to identify all field constituents. The cultural and cognitive elements analysed were aspects such as perceptions; decisions; human behaviour; culture and any other factors which affected the institutionalisation, or, non-institutionalisation, of renewable energy in the UK during the period. These structures; actors (individuals and organisations); actions; culture and cognition connected to the renewable energy subfield in the UK are the central units of analysis because they were intimately associated with the institutionalisation of renewable energy during the period. The criteria for interpreting the findings were based on the purpose of this thesis; its rationale and the research questions (Zucker, 2009). Since these are a detailed set of criteria, they are treated separately in section 3.7.

The decision was made to conduct a case study research because of its suitability for gaining a rich understanding of the phenomenon being investigated (Saunders *et al.*, 2009) and answering the exploratory questions (Maxwell, 2012; Yin, 2009). This strategy was also utilised because its findings have the practical function of immediately providing fresh insights on the institutionalised problem of energy provision in the UK (Zucker, 2010; Yin, 2009). Conversely, one of the main caveats of case study research is the failure of some researchers employing rigorous data collection methods (Bhattacherjee, 2012). For this reason, the next section provides readers with the information needed to make an informed judgement of the robustness of the research methods employed for this thesis.

3.5 RESEARCH METHODS

"A research method is simply a technique for collecting the data" (Bryman and Bell, 2011, p.41). There are several techniques (*ibid*, 2011, p.41), however, Yin (2009) identifies the following six: documents: archival records; interviews; direct observations; participant observation and physical artefacts. In keeping with the interpretivist position that underpins this thesis, this inquiry utilised two of those techniques, an analysis of archival records and interviews (*ibid.* 2009, p.89). Each method is described in turn as follows.

3.5.1 The Analysis of Public Documents

Following the lead of the other researchers (Jolly and Raven, 2015; Smink *et al*., 2015; Walker *et al.*, 2014; Sarasini, 2013; Xiangli, 2008; Sine *et al*., 2005) who investigated

institutional entrepreneurship in renewable energy subfields in other empirical settings, this thesis analysed archived public documents to support the primary data gathered to answer the research questions. As the name suggests, gathering evidence from archival records is a way of collecting data by analysing existing documents such as those published by the state and other reputable organisations (Bryman and Bell, 2011). The analysis of archival record took a "textual approach" (Gephart, 1993) by initially analysing archival data on matters pertaining to the renewable energy subfield in the UK for the study period 1986-2016. The starting point of the year 1986 is appropriate because two of the most salient events related to phenomenon being investigated occurred at this time- the advent of the renewable energy subfield in the UK (Smith, 2000; DTI, 1998) and the deregulation of the energy market (Cabinet Office, 2002). The analysis of archival records gathered data by interrogating government reports; policy documents; publications by credible data collection agencies such the Office for National Statistics (ONS) and the Environment Agency; position papers; whitepapers; company and industry association reports and other credible publications on issues related to the provision of energy in the UK during the period being investigated.

The analysis of the archival records began with a preliminary search on the internet to gather textual materials *vis-à-vis* the provision of energy in the UK. This enabled an initial account to be obtained of the physical, social and cultural site within which the research was conducted, in other words, the research setting (Bryman and Bell, 2011). In addition to painting a general picture of the context of the research setting, the initial analysis of archival records provided insights of the organisational field of energy provision in the UK and its renewable energy subfield. This enabled the identification of some of the key players within both fields and thus a shortlist of potential participants for this research project. As established by the literature review however, organisational fields are socially constructed by their constituents (Fligstein, 2001; Hoffman, 1999), therefore all the field constituents could not be identified by the analysis of archival records. Nevertheless, it served as a useful starting point for identifying some of the field constituents, who were then able to identify other relevant cohorts. The initial analysis of the archival documents was followed by a more in-depth interrogation of the government reports; policy documents; publications by authoritative data collection agencies such the

Office for National Statistics (ONS) and the Environment Agency; position papers; whitepapers; company and industry association reports. These documents, in both electronic and hard copy formats, provided a preliminary insight of how the renewable energy subfield had evolved over the period.

The analysis of the archival records was undertaken concurrently with the interviews and involved a process of iteration in which both data collection methods either supported or contradicted the other. When multiple opinions were obtained from different sources about the development of the subfield, additional information was gathered until a stage was reached whereby no further information was required to create a case narrative (Yin, 2009). This facilitated the triangulation of information obtained by both sources to develop a reasonably accurate timeline of significant developments within the field of energy provision. For example, the introduction of new regulations; policies; programs initiated by the government; demonstration projects; the entry and departure of technologies from the field of energy provision and the identity of key actors and organisations who were influential in shaping the renewable energy subfield.

An analysis of public documents was carried out for two main reasons. First, because a qualitative design was employed for this thesis it was necessary to gain an understanding of the physical, social and cultural site in which the study was conducted (Bhattacharya, 2008). In other words, the context of the empirical setting (*Ibid*, 2008, p.787). This is especially pertinent to institutional entrepreneurship research which focuses on analysing the evolution of organisational fields (Greenwood *et al.*, 2002). Much of the findings of the archival analysis is therefore presented in the chapter that follows to provide a background for the thesis and position the inquiry in the surrounding in which institutional change occurred or failed to occur. Second, since peoples' memories tend to be "fuzzy" (Oden, 1977), it was necessary to analyse archival records in order to either substantiate or invalidate informants' claims. Admittedly, the analysis of archival records for data collection has a number of drawbacks.

First, the analysis of archival records relied heavily on historical data and this may have introduced bias into the research. As Saunders *et al.,* (2009) criticise, secondary data may be inaccurate due to being second-hand information. Second, while an analysis of archival records is able to provide a relatively reasonable account of the physical elements

of a research setting, it captures social and cultural contexts sparingly. For those reasons, interviews were conducted to obtain first-hand data and capture the social and cultural contexts of the organisational fields being investigated (Saunders *et al.,* 2009).

3.5.2 Interviews

The interviews were semi-structured by design and aimed at generating the primary data needed to provide fresh insights for answering the research questions (Ayres, 2008; Kvale, 1996). This method of data collection involved interviews being conducted with informants connected to the renewable energy subfield and the overarching field of energy provision in the UK. Acting on Bryman and Bell's (2011) advice, it was ensured that the right sampling techniques were employed to recruit a set of participants who possessed the information needed to answer the research questions.

Recruiting the Participants

Sampling is the process by which actual data sources are chosen from a larger set of possibilities (Morgan, 2008). There are two broad categories of sampling techniques: probability sampling and non-probability or judgmental sampling (Saunders *et al.,* 2009). This research utilised two types of non-probability sampling techniques because of its qualitative design: snowball sampling and purposive sampling. The target sample for this research belonged to the organisational field as described in Chapter Two. Given this, those targeted for inclusion in the interviews ranged from domestic consumers of renewable energy to Country Managers of some of the major firms providing energy in the UK. Early into the recruitment process, difficulties were encountered in gaining access to some of these individuals and organisations due to negative perceptions of frequent requests from students to participate in academic research, a lack of perceived value of academic studies and potential informants not having the time and/or resources to participate (Saunders *et al.*, 2009). In order to overcome this constraint, the following four measures were taken: (1) familiarity was first gained with the organisations and/or individuals before making contact; (2) rapport was established with the gatekeepers of targeted organisations; (3) individuals at high hierarchical levels in organisations were often approached because they were usually the decision-makers (Bryman and Bell, 2011); and (4) access was often developed incrementally (Saunders *et al.,* 2009).

Initially, discussions were carried out with academics and a small group of practitioners connected with the renewable energy subfield in the UK to add to the list of potential participants identified by the analysis of archival records. Potential candidates were subsequently contacted by telephone and/or email to elicit their participation. The two sampling techniques used for this thesis were deployed strategically to capture two sets of informants. Snowball sampling was first deployed to capture a diverse range of informants. This sampling technique involved initially using a small pool of informants to nominate other participants who satisfied the eligibility criteria for this thesis (Morgan, 2008a). Following this, purposive sampling was used to recruit the most suitable informants for answering the research questions (Saunders *et al*., 2009) and for the other reasons elaborated upon in the next subsection.

The Sample of Informants

A total of thirty-nine (39) participants were recruited for the interviews. This comprised a diverse range of individuals to ensure that a balanced view of the phenomenon was captured (Bryman and Bell, 2011), that is, participants were recruited from both advocacy and antagonist groups. This included, but was not limited to, employees/associates of incumbent energy firms; renewable energy suppliers and developers; community energy support and advise organisations; actual users of domestic and commercial renewable energy and other relevant actors belonging to the organisational field of energy provision in the UK. The sample of participants for the interviews is as follows: incumbent energy firms (n=3); comparatively smaller renewable energy practitioners (n=25); civil servants representing local authorities (n=1); academics (n=1); domestic renewable energy consumers (n=4); commercial renewable energy consumers (n=4); managers of renewable energy test centres (n=1). The sample of informants recruited for the interviews is presented graphically in Table 3 that follows.

Table 3: List of Informants Interviewed for this Thesis

Int. No	Type of Informant/Role in Organisation	Gender	Type of Interview	Date
1	Domestic consumer	Female	Face-to-face recorded	27/01/16
2	Academic	Male	Face-to-face recorded	01/02/16
3	Founder/MD- Specialist Solar Developer and Consultancy	Male	Skype-recorded	08/02/16
4	Domestic consumer/Founder environmental action group	Male	Face-to-face recorded	09/02/16
5	Civil servant representing local authority	Male	Face-to-face recorded	11/02/16
6	Representative of hybrid fossil fuel/renewable energy power plant.	Male	Face-to-face recorded	04/03/16
7	Business Development Manager-Renewable energy firm (solar energy provider)	Male	Skype-recorded	17/03/16
8	Head of Facilities and Asset Solutions/Former Head of Energy-Developer of small renewable energy components.	Male	Skype-recorded	21/03/16 and 23/03/16

9	Domestic consumers	Couple (Male and female)	Face-to-face recorded	27/03/16
10	Owner and MD solar energy firm	Male	Face-to-face recorded	12/04/16
11	Owner and MD- Solar energy firm	Male	Face-to-face recorded	13/04/16
12	Owner and MD- Solar energy firm	Male	Face-to-face recorded	14/04/16
13	Owner and MD- Geothermal and solar provider	Male	Face-to-face recorded	14/04/16
14	Domestic consumers	Couple (male and female)	Face-to-face recorded	15/04/16
15	CEO- Wind and solar energy provider	Male	Skype-recorded	19/04/16
16	Founder and CEO- community renewable energy organisation	Male	Face-to-face recorded	20/04/16
17	Representative of commercial consumer	Male	Face-to-face recorded	22/04/16
18	CEO/Commercial Director- Waste-to-Energy start-up	Male	Skype-recorded	09/05/16

19	Head of Sustainable Energy Solutions- multinational hybrid fossil fuel/renewable energy firm	Male	Skype-recorded	12/05/16
20	Environment Officer- commercial renewable energy consumer	Female	Skype-recorded	25/05/16
21	Founder/CEO- Funder of renewable energy ventures	Male	Face-to-face Recorded	31/05/16
22	Founder/Director- Renewable biofuel producer	Male	Skype-recorded	07/06/16
23	Designer/Office Manager- Solar energy firm	Male	Face-to-face Recorded	08/06/16
24	Owner commercial renewable energy consumer	Male	Face-to-face Recorded	09/06/16
25	Managing Director- commercial renewable energy consumer	Male	Face-to-face Recorded	10/06/16
26	Founder and Managing Director- Biomass energy provider	Male	Skype-Recorded	16/06/16
27	Founder and Managing Director- Major solar energy provider	Male	Face-to-face Recorded	21/06/16
28	Founder and Managing Director- Specialist renewable energy recruitment firm	Male	Skype-Recorded	29/06/16
29	Assistant Managing Director- Renewable energy consultancy	Male	Skype-Recorded	01/07/16

30	UK Country Manager – Multinational hybrid fossil fuel/renewable energy assets developer	Male	Face-to-face Recorded	05/07/16
31	Technical Support Officer/Project Manager- Hydropower developer	Male	Skype-Recorded	10/07/16
32	Founder/Managing Director-Wind energy firm	Male	Face-to-face Recorded	12/07/16
33	Founder/Manager- Micro-hydro consultancy	Male	Skype-Recorded	16/07/16
34	Founder/Managing Director-Wind energy/biomass/Waste-to-Energy developer	Male	Skype-Recorded	20/07/16 and 22/07/16
35	Manager-small wind energy	Male	Face-to-face Recorded	22/07/16
36	Founder/Managing Director-Manufacturer of PV modules and LED lighting	Male	Skype-Recorded	02/08/16
37	Co-founder-community renewable energy producer	Male	Skype-Recorded	17/08/16
38	Independent Energy Consultant/Former employee of renewable energy firm	Male	Face-to-face Recorded	17/08/16
39	Commercial Director- Renewable energy test centre	Male	Skype-Recorded	02/09/16

As Table 3 shows, a diverse group of participants was recruited for the research, however, this skewed towards a high proportion of senior executives of renewable energy firms. Two of the main reasons for recruiting such a diverse range of informants was to capture a balanced view of both fields (field of energy provision and the renewable energy subfield) and to enable the examination of the various renewable energy sub-communities. For example, establishing if the different renewable energy sub-communities had varying degrees of agency because of their contrasting stages of development. The diversity of the group also enabled the capture of the subjective views of field constituents (Merriam, 2009; Crotty, 2003), thus providing a broad view of the field of energy provision. Although a diverse range of actors was targeted from renewable energy firms, the majority of participants were Chief Executive Officers (CEOs), mainly recruited by purposive sampling (Bryman and Bell, 2011).

The majority of CEOs and other senior executives were deliberately targeted for this thesis for four main reasons. First, these actors were recruited because they were the high-level strategists for their organisations. Since they were likely to be the strategists for their firms, they are those most likely to decide its fate and shape its culture (Schein, 2010). Their inclusion in the study may therefore assist with identifying some of those who might have practised as institutional entrepreneurs because these are actors who "skilfully use culture to legitimate their organisational innovations" (Rao, 1994, p.41). Should this be the case, recruiting these participants enabled the creation of institutional biographies of those who practised as institutional entrepreneurs (DiMaggio, 1988). Second, the CEOs and other senior executives who were most likely to be the "experts" in their organisations (Awad and Ghaziri, 2004). Due to being the "experts" in the field, they were likely to be knowledgeable about their firms' approach to managing renewable energy initiatives. This suggests that they possessed the information needed to answer the research questions (Babbie, 2015). Third, it is likely that the CEOs and other senior managers drafted internal renewable energy policies for their organisations and were those most likely to be directly affected by public energy policies. For example, if public energy policies were unconducive to the growth of renewable energy in the UK, these actors might decide to shed staff, whereas lower-level staff are unlikely to be in a position to decide their own fates. In other words, institutional entrepreneurs are rule-makers rather

than rule-takers (Child *et al.*, 2007). As DiMaggio (1988) explains, institutional entrepreneurs are shaped by their organisational fields, who in turn reshape those same fields. As such, founders are those most likely to have practised in the role of the main decision-makers for their organisations. Fourth, these participants are likely to be those in their organisations who might have practised as institutional entrepreneurs (DiMaggio, 1988). As Table 3 shows, at least twelve of the senior executives were founders of their organisations. One of the central tenets of institutional entrepreneurship theory is that institutional entrepreneurs are actors who create "new" institutions or reform existing ones (Hardy and Maguire, 2008; DiMaggio, 1988). This suggests that some of these participants might have practised as institutional entrepreneurs should they meet this and the other criteria for being classified as such (see table 5). Should this be the case, this would be useful for identifying some of the institutional entrepreneurs, thus gaining a first-hand view from those who might have contributed to shaping the renewable energy subfield during the period. In order to ensure that credible and useful information was obtained from these and the other participants, the interviews were planned in advance, as the next subsection explains.

Preparing for the Interviews

As Bryman and Bell (2011) explain, during semi-structured interviews the researcher has an interview guide which has a list of questions on fairly specific topics to be covered, but the informant has considerable leeway in how to reply. Acting on this advice, an interview guide based on the main themes surrounding institutional entrepreneurship theory (e.g. enabling conditions, legitimacy, etc.) was first developed to guide the interviewing process. The interviewees were however provided with the freedom to answer in their own words as this elicited new insight on the phenomenon (Saunders *et al.*, 2009). This was important because the interpretivist philosophy which underpins this thesis predefines the capturing of the subjective meaning of social life (Bryman and Bell, 2011) and this was most readily achieved by seeing the phenomenon through the eyes of those who experienced it (Hesse-Bider and Leavy, 2011).

The standard interview guide comprised thirteen questions directly related to answering the three research questions, however, due to the probing nature of semi-structured interviews (Bryman and Bell, 2011), sometimes additional "follow-up"

questions were posed. Questions were designed to encourage open responses to collect data that captured individual beliefs and assumptions about renewable energy, informants' personal traits; that of their work organisations; visions of energy generation and the actions taken and required to effect the diffusion of the technology across the UK. The questions focused on determining significant events in the development of renewable energy in the UK; identifying any cases of new practices or institutions being spawned; determining the enabling conditions which might have triggered institutional entrepreneurship; identifying and understanding the intervention strategies employed by actors and organisations to make renewable energy a part of the UK energy mix, and identifying how actors, their organisations, their activities and how renewable energy as a whole may have gained legitimacy in the UK. The interview guide was pilot tested on five individuals from the same target population between September and December 2015, who were thereafter excluded from the full study. A copy of the interview guide and the rationale for its design are provided in Appendix A.

Conducting the Interviews

Most of the interviews were either conducted face-to-face or by telephone as this provided the opportunity to personally analyse the informants and their organisational settings. This approach also enabled personal assurance to be provided about the way in which the information will be used (Saunders *et al.*, 2009). In some cases, face-to-face interviews included the use of modern technology platforms such as Skype. Although some interviews were conducted via Skype due to distance constraints, questionnaires were not administered via the internet because it was felt that they were incompatible with the inductive approach taken for this inquiry (Bryman and Bell, 2011). Further, questionnaires are reputed to have lower response rates than face-to-face interviews (MdDeros *et al.*, 2012). Since the flexible nature of semi-structured interviews enabled the interviewees to use words and ideas in a particular way, the interviews were tape-recorded verbatim to capture the informants' own views as this allowed for the analysis of the language being used (Bryman and Bell, 2011). The interviews which lasted for between forty-five (45) minutes and one and a half (1.5) hours long were transcribed by the present author after being recorded. Field notes recorded factsheet information about the participants and the interview environment to capture individual traits and contexts of individuals and

organisations (MdDeros *et al.,* 2012). Informants were provided with the opportunity to review, and correct if necessary, the contents of the interviews. Interviews were conducted until theoretical saturation was reached (Bryman and Bell, 2011). These methods were chosen to gather the data required to answer research questions because their probing and open-ended nature (Bryman and Bell, 2011) allowed for gaining fresh insights on an underexplored area (Maxwell, 2012). Additionally, they were also consistent with the interpretivist tradition assumed for this thesis which focuses on the interpretive meaning of social life (Schutt, 2011; James and Busher, 2009).

3.6 CRITICISM OF TAKING A MULTI-METHODS APPROACH

It is recognised that multi-methods qualitative studies have been criticised for quality-related issues pertaining to trustworthiness and generalisability (Saunders *et al.,* 2009). To address the issue of reliability, notes were made and retained relating to the research design, the reasons underpinning the choice of methods and strategy and the data obtained (*ibid,* 2009, p.328). As explained in section 3.3.1, the aim of this research was not to generalise to population but to theory, therefore this factor is not a major shortcoming. Member checking was used to validate the transcripts (Saunders *et al.,* 2009).

One major criticism of semi-structured interviewing is its inefficiency in capturing some kinds of data (Saunders *et al.,* 2009). For example, according to Bryman and Bell (2011), since semi-structured interviews rely primarily on verbal behaviour, some matters which the interviewees take-for-granted are sometimes not captured. Another major flaw of this approach is human deficiencies in providing precise chronological accounts of historical events (Oden, 1977) therefore the timeframe within which the study was conducted is briefed in the next section.

3.7 TIME HORIZON

Time horizon refers to the timeframe within which a scientific study is conducted (Saunders *et al.,* 2009). There are two possible time horizons: cross-sectional and longitudinal (*ibid,* 2009, p.156). Whereas studies conducted within a cross-sectional time horizon collect data only once and in a short period, longitudinal studies collect data from the same sample, several times, over a longer period (Payne and Payne, 2004). This research project was conducted within a cross-sectional time horizon (Saunders *et al.,*

2009) because the primary data were collected over a relatively short period of just over one year and participants were only interviewed once. By being conducted within a cross-sectional time horizon, this thesis was constrained by having not empirically tracked the full range of developments and changes within the subfield in the UK since its inception. In order to compensate for this, the case study collected archival data for the period 1986 – 2016 to incorporate a longitudinal element into the research (Saunders *et al.*, 2009). By so doing, this thesis was able to capture valuable information on changes within the renewable energy subfield over a period of a quarter of a century and the role institutional entrepreneurship might have played in this. However, it has been acknowledged that conducting a longitudinal study which relies heavily on secondary data can introduce bias, therefore it was ensured that the primary and secondary data collected for this thesis were rigorously analysed.

3.8 ANALYSING THE EVIDENCE

The analysis of the data collected for this thesis followed the interpretivist tradition (Geertz, 1973), based on hermeneutics (Wright, 1971). With this approach, principles relating to institutional entrepreneurship theory were used as sensitising devices to support the data analysis, especially the coding process. The analysis of the data was carried out concurrently with the gathering of the evidence (Merriam, 2009). Both the primary and secondary data were analysed thematically to pinpoint, examine and record patterns within the data (Bryman and Bell, 2011), with NVivo 11 analytical software assisting throughout the process. A process of iteration was followed to ensure that the understandings obtained by the analysis were truly coming from the data (Saunders *et al.*, 2009). Although iteration was carried out by going back and forth between the datasets, due to variations in the two data collection methods, the evidence was analysed separately and then converged towards the end. The procedure used for the analysis of the data is elaborated upon as follows.

Acting on Yin's (2009) advice, pattern matching was used to analyse the data gathered by the analysis of archival documents. This involved developing a time-series pattern which showed patterns or trends in the renewable energy subfield after important events, such as the passing of new regulations, legislation, policies or the entry or exit of key actors from the field. Potential patterns were then identified and subsequently

compared with the data to determine if they matched one better than the others. During the analysis, a determination was made of how institutional entrepreneurship activities had evolved in the subfield during the period being studied. The analysis of the archival documents was also used to formulate the research context and setting, which is presented as Chapter 4 that follows. This was a necessary undertaking, because "understanding institutional entrepreneurship demands rich, detailed, interpretive analysis that takes into account characteristics of the particular context in which it occurs" (Garud *et al*., 2002, cited in Maguire *et al*., 2004, p.660).

As mentioned earlier, the data gathered by the interviews were analysed inductively using hermeneutics for interpretation, (Bryman and Bell, 2011; Newton, 2011). The general steps taken were: (1) initially reading through the transcripts and writing memos. The memos were stored in a memo folder created in the Internals section of NVivo11; (2) the data were coded by segmenting and labelling the texts. A coding scheme was developed for this process on NVivo11; (3) the codes were used to develop themes by aggregating similar codes together; (4) the themes were connected and interrelated; and (5) a narrative was constructed (Saunders *et al.,* 2009). The techniques used for the transcription and coding are detailed as follows. The transcription process involves reproducing the taped interviews in actual words (verbatim), not only noting what was said but also how it was said (Saunders *et al.,* 2009). When transcribing, measures were taken to ensure that the transcription was accurate as possible by correcting all transcription errors in a process of data cleansing (Saunders *et al.,* 2009). Each transcribed interview was saved as a separate word-processed file and stored in a folder created in the Internals section of the project titled: IE.RES.UK created using NVivo11.

The data were coded according to the conceptualisation of institutional entrepreneurship as set out in the literature review and as contextualised by the theoretical framework in the previous chapter. That is, institutional entrepreneurship is perceived as the creation of new institutions or the transformation of existing institutional arrangement(s) by actors (institutional entrepreneurs) who possess sufficient resources to realize interests they value highly (DiMaggio, 1988). The analysis included topic commonality and topic intensity among the participants. Existing institutional arrangements were coded in terms of descriptions provided of the field or reasons why

actors entered into the renewable energy subfield during its formative years. Successful institutionalisation projects were coded under the category "Institutional Changes". The creation of new institutions, practices, or institutional logic which had fully departed from traditional institutional arrangements were coded under the category full institutional change, whereas changes which have only taken place in part were coded as partial change.

Informants' perceptions of what constituted the organisational domain within which they were operating or belonged were coded as organisational field. Coding organisational field this way contributes to making a determination of exactly what constitutes an organisational field. Acting on the advice of Hardy and Maguire (2008) and DiMaggio (1988), the institutional entrepreneurs were identified by close reading the data to see which actors had been responsible for enacting enduring, pervasive and taken-for-granted institutional change. As such, the institutional entrepreneurs were coded as any actor who brought about enduring institutional changes and met the other criteria set out in Table 5. While examining this data, any properties unique to those identified as institutional entrepreneurs was coded as "Properties of Institutional Entrepreneurs". Coding "properties" this way enabled an institutional biography to be created for those who practised as institutional entrepreneurs.

Enabling conditions were coded as those factors which may have triggered institutional entrepreneurship. This included both historical factors which may have initially triggered institutionalisation projects in the renewable energy subfield and existential conditions which motivate or demotivate entrepreneurial activities. Coding enabling conditions this way facilitated the identification of the trigger(s) of institutional entrepreneurship (Lawrence and Suddaby, 2006). Categories were created for institutional constraints which were coded in terms of internal contradictions such as constraints imposed by incumbent energy firms (e.g. the Big 6 energy companies) and external factors such as social, political, technological and environmental causes. As illustrated by the theoretical framework, these are the general conditions which either facilitated or hindered institutional entrepreneurship. All strategies utilised by these actors in response to identified institutional constraints and aimed at changing existing institutional arrangements or introducing new ones were coded as intervention strategies. Coding

intervention strategy this way enabled the identification of the actions undertaken by institutional entrepreneurs in the subfield to enact institutional change and differentiated between successful and ineffective ones.

Two broad categories were created to indicate whether or not the institutionalisation project had been a success (Overcoming the Paradox of Embedded Agency), or if actors had remained constrained by existing institutional arrangements (Inertia to Change). Further subcategories were created to establish how legitimacy was attained: regulatory; normative and/or cultural/cognitive. In this instance, data which portrayed renewable energy or institutional entrepreneurs in the subfield in a positive or neutral way were coded as conferring legitimacy, whereas data portraying them negatively were coded as questioning their legitimacy. Successful renewable energy initiatives and actors which had widespread support were coded as having attained legitimacy, whereas those which had not were coded as "non-legitimate" entities. Coding legitimacy in such a way facilitated an understanding of how the new institutions gained legitimacy. For example, whether through regulation, legislation or technical standards in the case of the regulatory category, or, through norms, responsibilities, obligations and rightness of the new technology in the case of the normative category. In the case of the cognitive category, through assumptions/beliefs about the effectiveness and benefits of policies; technologies and practices related to renewable energy. A final indicator category was created for norms/taken-for-granted to indicate whether or not the new institutions were self-sustaining. If the new or transformed institution was coded as being in an advanced state of pervasiveness or being taken-for-granted, then it was deemed as being institutionalised. A broad category titled "Carriers of Institutions" was created to disclose the manner in which the new or transformed institution was diffused. Subcategories or themes were created under this category to identify if this was achieved through measures such as increased objectification or through pragmatic legitimacy. Two types of codes were created and developed for the thesis, a priori codes and inductive codes (Saldana, 2013). While a priori codes are those developed before the data were analysed, inductive codes are those developed by directly examining the data (Johnson and Christensen, 2008). Table 4 on the next page lists the "*a priori*" codes. Since the inductive codes were developed during the analysis of the data, they are presented in Table 6 in Appendix D.

Table 4: A Priori Codes Developed for the Thesis

A priori categories	A priori codes	Indicators
Institutional change	Complete change	New rules, practices, enduring, pervasive, taken-for-granted.
	Partial change	Change not fully entrenched; a mixture of old and new rules apply; uncertainty about its survival; patchy dispersal of organisational entity.
	No change	Displays most or all of its former properties.
Organisational field	Area of operation	Occupation; industry; etc.
Institutional entrepreneurs	Institutional entrepreneurs	Actor who initiated and implemented divergent change
Properties of institutional entrepreneurs	Qualities/attributes/properties/ Characteristics	Different from others in the field; may be properties such as resourceful; social skills; etc.
Enabling conditions	Field-level conditions	Internal factors such as conflicts; competition; etc.
	Actors' social position	Status of the actor in the field, such as being the elite; etc.
Institutional constraints	Internal contradictions	Conflicts; competition; etc.
	External factors	Social; political and other external factors which facilitate or hinder operations /performance; etc.

Intervention strategy	Intervention strategy	Planned; deliberate; strategic
Overcoming the paradox of embedded agency	Broke from existing rules and introduced new ones.	Innovation displays the characteristics of being institutionalised.
Inertia to change	Mechanism preventing change from occurring.	Barrier hindering the development and entrenchments of the new organisational form.
Legitimate entity	Regulative legitimacy	Legally sanctioned
	Normative legitimacy	Morally governed
	Cultural/cognitive	Culturally supported/ cognitively correct
Non-legitimate entity	Entity is not accepted or considered inappropriate	Questionable; threat of not surviving
Taken-for-granted	Taken-for-grantedness	Self-sustaining
Carriers of institutions	Vehicle used to move institutional elements from place to place and time to time.	Symbolic systems-conveys information about rules; relational systems- governance systems; regimes; routines-jobs, standards; artefacts-compliant objects.

In order to assist with the electronic coding, a separate hard copy identification protocol was developed to identify the institutional entrepreneurs. The protocol, which is presented as Table 5 in Appendix C, has the following ten criteria to be met to be classified as an institutional entrepreneur: (1) introduced an alternative way of operating; (2) stand out from others in the field; (3) objective proof of reshaping the field; (4) owner/developer of major renewable energy venture; (5) direct role in shaping policy; (6) pioneer or innovator in renewable energy; (7) major renewable energy player; (8) significant role in driving the deployment of renewable energy; (9)

significant role in stymieing the diffusion of renewable energy; and (10) possess exceptional qualities/characteristics. Each criterion is now rationalised.

The first criterion, "introduced an alternative way of operating", qualifies as an appropriate identifier because institutional entrepreneurs "spearhead collective attempts to infuse new beliefs, norms, and values into social structures" (Rao *et al.*, 2000 p.240). The second criterion, "stand out from others in the field" is an appropriate measure because institutional entrepreneurs tend to take the lead in initiating institutional change, rather than being followers (Child *et al*., 2007; Battilana, 2006). "Owner/developer of major renewable energy venture" is a suitable unit for inclusion because institutional entrepreneurs actively participate in the implementation of institutionalisation projects (Battilana *et al*., 2009). The fourth criterion, "objective proof of reshaping the field", is an appropriate measure because the principal activity of institutional entrepreneurs is to shape or reshape institutional arrangements in organisational fields (DiMaggio, 1988). The fifth criterion, "direct role in shaping policy" is a suitable gauge because as Meyer and Rowan (1977) argue, policies can serve as powerful structural myths if they are institutionalised. Since some public energy policies (such as renewable energy regulations) are types of regulative institutions (Scott, 2003), those responsible for their shaping may qualify as institutional entrepreneurs. The sixth criterion, "pioneer or innovator", is justifiably an indicator because institutional entrepreneurs initiate divergent change (Battilana, 2007). "Major renewable energy player" is a worthy identifier of institutional entrepreneurs because these are actors who possess the resources needed to change organisational fields at a macro level (Battilana, 2006; DiMaggio, 1988). The eighth criterion, "significant role in driving the diffusion of renewable energy", is suitable for inclusion in the protocol because institutional entrepreneurs lead efforts to enact institutional change (Rao *et al*., 2000). "Significant role in stymieing the diffusion of renewable energy" warrants being one of the identifiers because institutional entrepreneurs do not only change existing institutional arrangements in organisational fields, they may also choose to maintain them (Lawrence and Suddaby, 2006). The final criterion, "possess exceptional qualities/characteristics" is an appropriate scale, because as Hardy and Maguire (2008, p.280) posit, institutional entrepreneurs possess "special characteristics\; qualities and attributes- which distinguish" them "from others in the field". The identification protocol was applied to both datasets. In addition to

applying the protocol to ensure that the analytical process was robust, the focus of the analysis was to gain a deep understanding of what was really going on.

As pointed out earlier, the analysis of the data was an interpretive process based on hermeneutics, an approach that focuses on the understanding and interpretation of text (Bryman and Bell, 2011). This approach assisted the present researcher in making sense of what has been produced (Silverman, 2015) by construing meaning (Firmin, 2008). Hermeneutics was operationalised *a priori* (Firmin, 2008) by drawing on Bloomberg and Volpe's (2008) two-step interpretation outline tool for guidance. During Step 1, the review notes were revisited to see how the findings related to the research questions (Bloomberg and Volpe, 2008). While doing so, the initial responses were factored into the findings to gain a general understanding of the content (Silverman, 2015). At this stage, notes were made on first impressions as these initial findings were useful for later interpretation (Wolcott, 1994). To facilitate the interpretation, the following questions were asked: *"What is really going on? "What story are the findings trying to tell?" "What is important in the findings?" "Why are they important?" "What can be learnt from them?" "What other possible explanations are there?"* (Bloomberg and Volpe, 2008). The similarities and differences in the findings were identified and noted (Wolcott, 1994). The second step involved thinking critically, linking the findings to the literature in order to contextualise them. Consideration was given to the relationships between the themes to determine how they might have been connected (Silverman, 2015), considering all possible explanations and not taking the findings at face-value (Bloomberg and Volpe, 2008) The findings were then converged to gain an understanding of institutional entrepreneurship in the renewable energy subfield in the UK.

The decision was taken to simultaneously analyse the data because it allowed for iteration between the two types of datasets, thus strengthening the data collection and analytical processes as the study progressed (Newton, 2011). In so doing, it facilitated triangulation, which had the ensuing effect of minimising bias (Saunders *et al.*, 2009). Conversely, it was soon realised that this approach was time-consuming (Merriam, 2009), therefore a robust time management strategy was employed to manage the time efficiently. It was also recognised that one of the main criticisms of qualitative research is the alleged lack of credibility (Bryman and Bell, 2011), therefore the measures employed to ensure that the study attained an acceptable level of integrity are discussed in the next section.

3.9 RESEARCH INTEGRITY

Research integrity refers to the trustworthiness of the research due to the soundness of its methods and the honesty and accuracy of its presentation (Draft Singapore Statement, 2010). With specific reference to this thesis, research integrity considers how the inquiry dealt with bias; achieved an acceptable level of trustworthiness; how the constraints in the interpretation of the findings were delimited and how ethical issues were addressed.

3.9.1 Dealing with Biases

One of the main caveats of qualitative research is its susceptibility to bias (McCambridge *et al*., 2014). Bias is any influence that distorts the findings of scientific research (Polit and Beck, 2014). It is a fundamental concern in qualitative research because the subjective nature of naturalistic inquiries makes it difficult for the researcher to be completely detached from the data (Babbie, 2015). Two broad categories of bias have received the bulk of attention in literature, participant bias and researcher bias (Pannucci and Wilkins, 2010). Each potential bias is now considered.

Participant bias

Participants bias is a situation in which the informants second-guess what the researcher is after; construct their responses to please the interviewer, or, present partial views (Smith and Noble, 2014). As can be seen from the list of participants (Table 3), the majority of informants were renewable energy practitioners. This clustering of informants had the potential of presenting an unbalanced view of renewable energy; the renewable energy subfield and the informants themselves; if the appropriate precautionary measures had not been applied. In order to minimise this potential bias, three main measures were employed. First**,** informants were recruited from different renewable energy sub-communities. This is likely to have contributed to minimising participant bias because different organisational fields have different institutional context (DiMaggio, 1991). That is, the informants are likely to have had different opinions because of factors such as exposure and experiential variations; they belonged to different relational networks (Scott, 2014); and so forth. Second, the questions and questionnaires were designed to be impartial. This is likely to have contributed to minimising participant bias as it ensured that responses reflected different perspectives, for example, that of incumbent energy providers. Third, the researcher maintained a neutral stance while interviewing. Again, this is likely to have

contributed to minimising participant bias as it fostered an atmosphere of objectivity, thus generating unbiased views during the interviews.

Two other potential participant biases were acquiescence bias (Moss, 2008) and social desirability bias (Neeley and Cronley, 2004). Acquiescence bias occurs when the informant demonstrates a tendency to agree with and be positive about whatever the interviewer asks (Moss, 2008). In order to mitigate this bias, the interview guides were deliberately designed to be short as this is likely to have minimised fatigue (Babbie, 2015). The questions were also constructed to tease out the participants' true views (Moss, 2008) instead of being leading. Social desirability bias involves the interviewee presenting oneself positively by over-reporting views and behaviours (Neeley and Cronley, (2004). In order to minimise this potential bias, the questionnaires were designed to ask indirect questions (*ibid*, 2004, p.432), thus generating opinionated views instead of "yes" and "no" responses (Babbie, 2015). This approach was enhanced by the researcher assuming an appropriate position during the interviews, an important approach which the next subsection explains.

Researcher bias

Researcher bias is a situation in which the findings are influenced by the researcher (Pannucci and Wilkins, 2010). In order to overcome this potential problem, the researcher ensured that personal beliefs were not imposed during the interviews and framed the questions tactfully (Easterby-Smith *et al.*, 2008). Data were also collected from multiple sources (interviews and archived documents) to facilitate triangulation, which in turn contributed to reducing researcher bias (Bryman and Bell, 2011). Another strategy used to minimise this potential bias was standardising the interviewer's interaction with all the participants and increasing the trustworthiness of the research (Pannucci and Wilkins, 2010).

3.9.2 Trustworthiness

It is extremely important that trustworthiness is established in qualitative research because failure to do so can result in the study lacking rigour (Shenton, 2004). Trustworthiness refers to the way in which qualitative researchers ensure that transferability, credibility, dependability, and confirmability are present in their research (Given and Saumure, 2008). The following procedures were employed to ensure that the study attained an acceptable level of trustworthiness:

Transferability

Transferability refers to the extent to which the results of the study can be transferred to other situations and contexts beyond the research setting (Jensen, 2008). Due to the relatively small sample size used for this thesis, it would be irresponsible to state unequivocally that the results are applicable to the entire UK population. However, by providing sufficient contextual information about the fieldwork sites, readers can make their own judgement about such a transfer (Shenton, 2004). To further strengthen transferability, a thick description is provided of institutional entrepreneurship and some of the main issues surrounding it to enable readers to have a good understanding of the practice and make an informed comparison of the practice in other research settings (*ibid,* 2004, p.70). It is to be however noted that the focus of this thesis is not to produce transferable results, instead, it aims to gain and provide a better understanding of institutional entrepreneurship and its role in transforming existing institutional arrangements within the field of energy provision in the UK (DiMaggio, 1988).

Credibility

Jensen (2008a, p.138) defines credibility as "the methodological procedures and sources used to establish a high level of harmony between the participants' expressions and the researcher's interpretations of them". The following measures were adopted to optimise the credibility of the thesis:

1. Research methods which have been well-established in qualitative inquiry and information science were adopted for the thesis (Shenton, 2004);
2. Familiarity was gained of the cultures of the participating organisations before embarking on data collection in order to develop the trust of the participants. It was however ensured that this did not influence their judgement (Shenton, 2004);
3. Triangulation was achieved by using two data collection methods to either corroborate or contradict the findings of the other (Bryman and Bell, 2011);
4. Respondent validation- the research findings were submitted to relevant informants to confirm that the information they had provided were correctly interpreted (*ibid,* 2011, p.396).

The credibility of the research was also enhanced by employing robust analytical techniques and increasing its dependability.

Dependability

Two of the main challenges of working within a qualitative context are the variability of the environment and its openness to change (Jensen, 2008). Dependability involves using appropriate methodologies to account for these issues (*ibid*, 2008, p.2008). To increase the dependability of this thesis, a detailed description is provided of the interviewees and their organisations to enable future researchers to conduct their inquiries using similar subjects, as this is likely to yield similar results (Shenton, 2004). A similar procedure is also followed for explaining how archival records were reviewed and how the data were analysed, that is, detailed descriptions are provided of the methods used for data collection and analysis. To further enhance the dependability of this thesis, a journal was prepared for the NVivo element of the analysis, along with factsheet information about the informants and the settings in which the interviews were conducted. Since the analysis of archival records component of the study might have been biased by the use of secondary data (Babbie, 2015), this method was supplemented by the collection of primary data to facilitate triangulation (Golafshani, 2003).

Confirmability

Confirmability relates to the accuracy of the truth or meaning being expressed in the study (Jensen, 2008b). Since interviews were one of the data collection methods used to increase the confirmability of the study, it was ensured that the correct set of codes were applied to obtain messages that add to the existing body of knowledge (Shenton, 2004). Subsequent judgements made from these insights were objective, free of the researcher's biases and correctly interpreted (Jensen, 2008b). To reduce the probability of the researcher's subjectivity being introduced into the interviews, the interview guides were designed to be broad and general to solicit the informants' own opinions and ideas and not that of the researcher (Golafshani, 2003). Confirmability was achieved during the data analysis by having multiple codes for the same datasets in order to establish a measure of consistency with the coded themes (Jensen, 2008b). To further enhance the confirmability of the thesis, the research process is made transparent by thoroughly describing how the data were collected and analysed (*ibid*, 2008b, p.112). It is however recognised that there are some constraints beyond the control of the researcher which affect the trustworthiness of a research project, therefore these are espoused in the section that follows.

3.9.3 Delimitations

Delimitations are the constraints in the interpretation of the findings of the thesis and also indicate the boundaries associated with its methods (Sampson, 2012). One of the main limitations of this thesis is inherent in its approach. Due to adopting a qualitative approach, critics might argue that its findings cannot be generalised to the entire UK population (Bryman and Bell, 2011). This is particularly relevant since this thesis alludes to the claim that its findings are applicable to the entire renewable energy subfield in the UK. Although a relatively small group of interviewees participated in the interview, by purposively selecting a group of informants from the different UK countries; actors in positions to influence energy policy; speak on behalf of influential energy firms (e.g. senior representatives) which significantly altered energy provision in the UK, this limitation was addressed.

Another major limitation of the research design for this thesis is credibility (Sampson, 2012). In order to overcome this limitation, well-established qualitative methods rooted in science were used and it was also ensured that multiple methods were used to facilitate triangulation. Respondent validation was also conducted. Being conducted within a cross-sectional time horizon was another limitation because this resulted in the primary data being collected within a relatively short period of time. On its own, this might have only provided a snapshot of the situation. This effect was offset by analysing archived public records which span a longer period, resulting in the capture of information collected within a longitudinal timeframe. The integrity of the research was further enhanced by ensuring that ethical issues were appropriately addressed throughout the study.

3.9.4 Research Ethics

Research ethics refer to the appropriateness of the researcher's behaviour in relation to the rights of those who are subjects of the study or are affected by it (Saunders *et al.*, 2009). These issues are of particular relevance to this thesis because it involved the participation of human subjects. Since most ethical issues can be anticipated and dealt with at the design stage, measures were put in place to plan and conduct the project in line with the main ethical principle of not causing harm (*ibid*, 2009, p.188). To achieve this, data collection methods and research strategy were designed and operationalised to be sensitive to all participants (Cooper and Schindler, 2008), with ethical issues being addressed at each stage as illustrated by Figure 2. The following

specific measures were also adopted to ensure that the research was conducted ethically:

- The research was carried out in accordance with the Kingston University Ethical Guidelines and signed off by the Ethics Committee;
- The research was conducted in accordance to the guidelines of the Data Protection Act (1998);
- An informed consent form was developed stating the participants' rights during the study and requires being signed off before they are allowed to participate in the research;
- The anonymity and confidentiality of the participants are maintained by using pseudonyms throughout the study and in the subsequent written report;
- The gathered data were stored, and will be stored securely, retained for a period agreed by the university and destroyed at an agreed time; and,
- The information obtained by the thesis is disseminated in a way seen fit by the Ethics Committee.

Fig

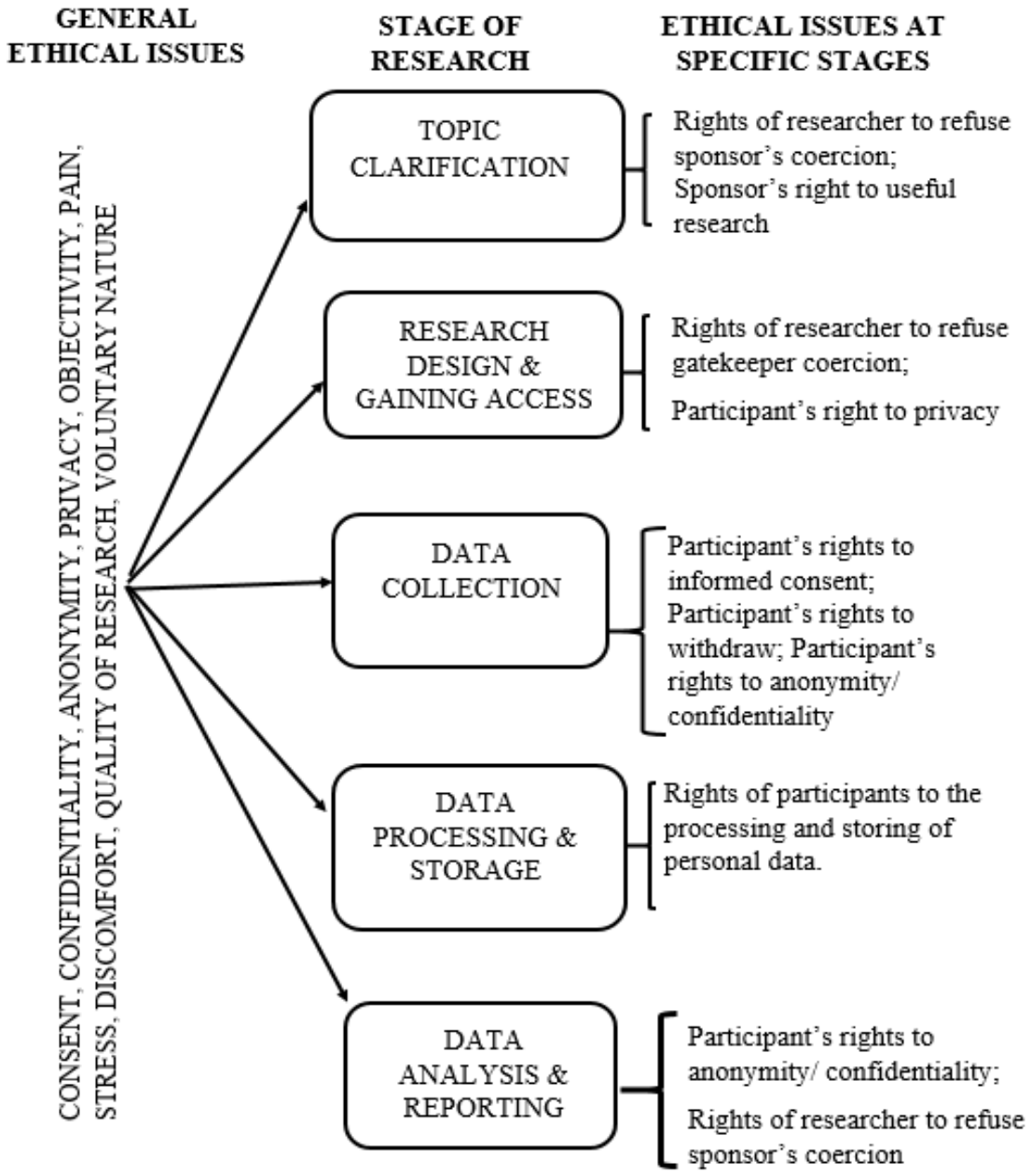

Figure 2: Illustration of the Procedure used to Address Ethical Issues at Various Stages of the Research Project. ***Adapted from Saunders et al. 2009***

3.10 CONCLUDING COMMENTS

This chapter has discussed the methodology used to conduct the research. Taking into account the purpose of this thesis, its theoretical foundations and the research questions, the inquiry is appropriately placed within the epistemological position of interpretivism. Having assumed this stance, a constructionist ontological position has been embraced for this thesis because it is believed that social phenomena and their meanings are continually being accomplished by social actors (Bryman and Bell, 2011). For those reasons, an applied axiological position has been adopted by this thesis because it strives to inform practice; policy and future research (Hiles, 2008).

An exploratory research design has been employed for the thesis because the topic was unexplored prior to this inquiry being undertaken. This dictated that an exploratory, flexible strategy be utilised because of the lack of existing data on the topic in this unique setting. The philosophical assumptions made are therefore congruent with the exploratory design because it objectively interprets the informants' subjective views of the phenomenon (Bryman and Bell, 2011). In being consistent with most institutional entrepreneurship research, two methods were employed for data collection, semi-structured interviews and the analysis of public archival documents. As pointed out above, because the topic was under-researched, empirical data were scarce. An exploratory case study therefore had to be conducted on the renewable energy subfield in the UK for the period 1986-2016 to formulate a timeline of significant events and to add to the initial shortlist of potential informants for the interviews. Semi-structured interviews were conducted because they provided informants with the leeway needed in their responses to understand a previously unexplored phenomenon (Bryman and Bell, 2011).

Admittedly, the thesis has a number of limitations, the main one being the qualitative approach adopted for the inquiry because allegedly these types of studies lack generalisability (Bryman and Bell, 2011). For that and other reasons, a number of measures were employed to optimise the trustworthiness of the thesis, including triangulation, member checking, adherence to ethical obligations, *inter alia.* In line with the principles of the interpretivist perspective assumed for this thesis, the methodology covered in this chapter provided the tools needed to open the black box of a complex phenomenon such as institutional entrepreneurship in the empirical setting of the renewable energy subfield in the UK.

CHAPTER FOUR

RESEARCH SETTING and CONTEXT

4.1 INTRODUCTION

This chapter describes the research setting and context of the thesis. As explained in the methodology chapter, in order to fully understand the process of institutional entrepreneurship, it is necessary to examine and describe the setting and context in which it unfolds. By so doing, it sets the scene for the inquiry by providing readers with an understanding of the characteristics of the research setting, the UK, and some of the key features related to way it provided its energy during the study period. To clarify, the research setting is the physical, social, and cultural site in which the research was conducted, while the contexts are the circumstances which affected the way in which the UK provided its energy. Despite gathering secondary information from published sources, this chapter is not a literature review but is rather a compilation of the information gathered by the analysis of the archival documents. In order to achieve this, it perused national statistical data; policy documents; government reports; trade industry data and other credible sources to obtain the information needed to inform readers on relevant matters relating to the research setting and context of the field of energy provision in the UK, the primary unit of observation for this thesis.

The chapter proceeds as follows. Following the introduction, section 4.2 presents the research setting in order to familiarise readers with the characteristics of the UK which are of particular relevance to this thesis. Section 4.3 examines the UK's energy landscape to gain an understanding of the important characteristics which influence the way in which energy is sourced and provided in the UK. Section 4.4 presents a chronological account of the key critical events which took place in the field of energy provision in the UK during the period 1986-2016. Section 4.5 identifies the key makers and shapers of the regulative rules in the field of energy provision in the UK, during that same period. Section 4.6 briefly describes some of the main regulative institutions in the renewable energy subfield. Section 4.7 closes the chapter with a concluding statement.

4.2 RESEARCH SETTING

The research setting for this thesis is the renewable energy subfield in the UK. This setting represents an interesting area of research because the UK is characterised by having a relatively high energy demand (BEIS, 2016a) and some of the best renewable energy resources in Europe (DECC, 2009). Despite these attributes, the UK is behind other European countries in the deployment of renewable energy (EC, 2017). For this

reason, a useful starting point is to try and provide an understanding of some of the characteristics of the renewable energy subfield in the UK and the features of the country which influence this.

The renewable energy subfield is embedded within the field of energy provision, a domain comprised of many subfields. These subfields include but are not limited to, the oil and gas subfield; the coal subfield and the nuclear energy subfield. The area of interest for this thesis however, is the renewable energy subfield, because of factors unearthed by the literature review and the unique qualities of the research site, the UK. Located in Western Europe at latitudes $49^{o} – 61^{o}$ N and longitudes 9^{o} W to 2^{o} E, the country lies between the North Atlantic Ocean, the North Sea and France (World Atlas, 2016). Due to this opportune location, the UK has some of the best wave, wind and tidal resources in Europe (DECC, 2009). Four countries make up the UK: England, Northern Ireland, Scotland and Wales (EU, 2017a). Together, the country covers an area of 248,531 square kilometres and is surrounded by a coastline stretching some 17, 820 km long (ONS, 2017d; Ordnance Survey, 2017). The UK's terrain is mostly hilly, comprised of rugged hills and low mountains to the north and west (Ordinance Survey, 2017a). The east and southeast are mostly level, rolling plains (*ibid*, 2017a, p.1). Due to this topographical configuration, the majority of hydropower resources are located in the hilly regions of Scotland in the north, whereas the east and southeast are ideally suited for utility-scale solar PV (DECC, 2009). Much of the UK is ideal for commercial-scale biomass and waste-to-energy schemes because of the composition of household and commercial wastes (DECC, 2013a).

The UK's weather is mostly influenced by the Gulf Stream (Met Office, 2016c). Although the country has relatively mild winters because of this, heavy snowfall on high grounds assure a reliable source of water for hydropower schemes in those terrains (DECC, 2011a). This is enhanced by the UK having a generally wet climate, averaging 885 millimetres of annual rainfall, or, 133 days of rain or snow each year (Met Office, 2017). In recent years, the increased average annual rainfall may have contributed to the much-publicised spate of floods (Met Office, 2016b). Generally, the UK is not a very sunny country, with more than one-half of the days being overcast (Met Office, 2017). Surprisingly, this has not hampered the country in having good solar potential, as its horizontal solar irradiation level ranges from 750-1,100 kilowatt-hours per square metre each year ((kWh/m^2/yr.) (Newquay Weather Station, 2019). Figure 3 on the next page illustrates this. To put this into context, a

house with a 1kW rated PV solar panel situated in Plymouth (the region has an average annual solar insolation of approximately 1050 kWh/m^2) would produce about 800 kWh of electricity in a typical year. The UK is very windy due to its long, exposed coastlines (Met Office, 2017), consequently, it has the best wind energy resources in

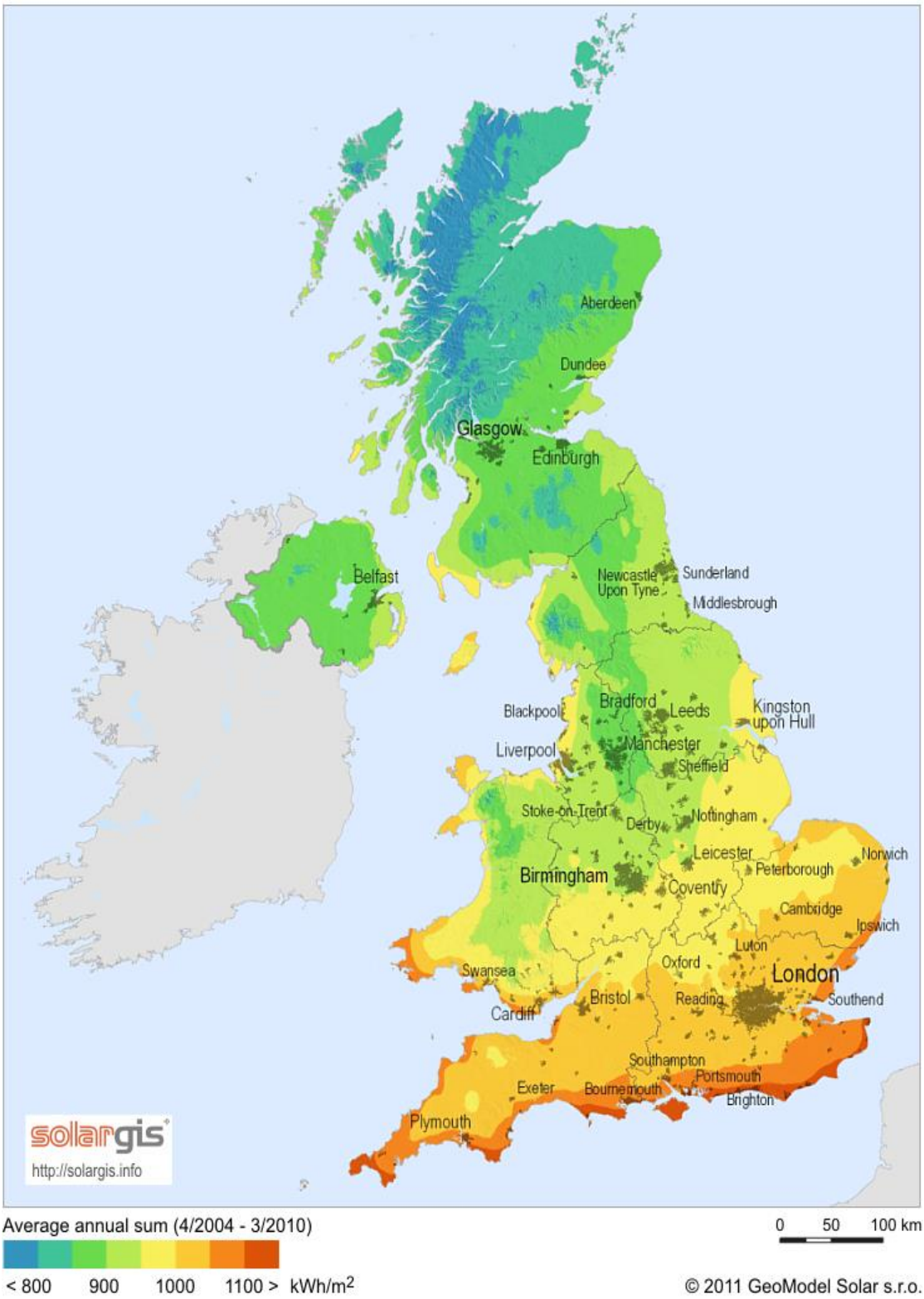

Figure 3: Global horizontal solar irradiation for the UK. ***Source: GeoModel Solar, 2011.***

Scotland and Wales, and is therefore ideally suited for commercial-scale wind energy development. Despite being very windy, recently air pollution levels have reached "very high" or high" in many parts of the UK, causing considerable suffering to people with respiratory conditions (Defra, 2017).

As mentioned in Chapter One, at the end of 2015 the population of the UK was approximately 65,100,000 people, growing at a rate of 0.5 per cent per year (ONS, 2017a). This was the fastest population growth in Europe that year (*ibid*, 2017a, p.1). The UK is a highly urbanised country, with almost 87 per cent of its citizens living in urban areas. The country has capitalised on it considerable natural resources to become the fifth largest economy in the world, with a GDP of £470,527 million as at the end of 2014 (ONS, 2016b). The main industries in the UK are services (80.2%); industry (19.2%) and agriculture (0.6%) (Parliament UK, 2016). Buoyed by a relatively low unemployment rate of 5.1 per cent in 2016, the purchasing power of UK citizens is relatively high, with each individual having an average annual income of approximately £33,945.69 in that year (ONS, 2017e). Characterised by the relatively high purchasing power of its citizens; a well-developed transportation network; sizable domestic and service sectors, a vast amount of energy is consumed in the UK every year (BEIS, 2016a).

4.3 THE UK ENERGY LANDSCAPE

As highlighted in Chapter One, the final energy consumed[7] in the UK in 2015 was 137,430 ktoe (BEIS, 2016a). This represented an increase of 1.7 per cent on the previous year, mainly due to the increased demand for natural gas caused by a lower than usual mean temperature (*ibid*, 2016, p.6). To put this into context, an average petrol car is able to travel approximately 417,840 km on one tonne of oil equivalent (toe) of fuel and there are roughly 99.933 toes of oil in one kiloton. The transportation sector accounted for the largest share of final energy consumed (40%), "followed by the domestic sector (29%); industry (17%) and the service sector (14%)" (BEIS, 2016a, p.8). Although the UK's energy consumption has fallen by 17 per cent since 1980 (ONS, 2017a), there have been episodic increases in demand (e.g. in 2010 and 2015). This is mainly due to abnormal weather conditions and changes in lifestyle and industry. Transportation has consistently been the largest consumer of energy since

[7] The energy consumed by final end users after transformation, as opposed to primary energy consumption which is energy in its original state.

1988 (BEIS, 2016a). Interestingly, between 1970 and 1984 the industrial sector accounted for the largest share of final energy consumed, but a shift from heavy energy-intensive industries has caused this to change (DTI, 2003). As explained earlier, UK citizens have a relatively high purchasing power and this has driven the increase of car ownership. This may have had the knock-on effect of the transportation sector surpassing industry and domestic sectors as the main consumer of energy in the country (BEIS, 2016a).

The UK's energy landscape is dominated by two main technologies- fossil fuels and low-carbon energy technologies (BEIS, 2016a). In 2015, fossil fuels provided 82 per cent of the UK's energy, low-carbon technologies 16.5% and other, 1.5% (*ibid,* 2016a, p.155). Although data provided for the fuels consumed are usually grouped under the two broad categories (fossil fuels and low-carbon technologies), this can be further aggregated by technologies. The main fossil fuel technologies used were coal, gas and oil, while the low-carbon technologies were nuclear and renewable energy technologies (*ibid,* 2016a, p.158). Other refers to the net imports of electricity and non-biodegradable wastes (*ibid,* 2016a, p.17). In 2015, petroleum accounted for 47 per cent of final energy consumed; natural gas- 29 per cent; coal- 7.8 per cent; nuclear- 7.9 per cent and renewable energy- 8.3 per cent (BEIS, 2017). Figure 4 below presents a graphical representation of this.

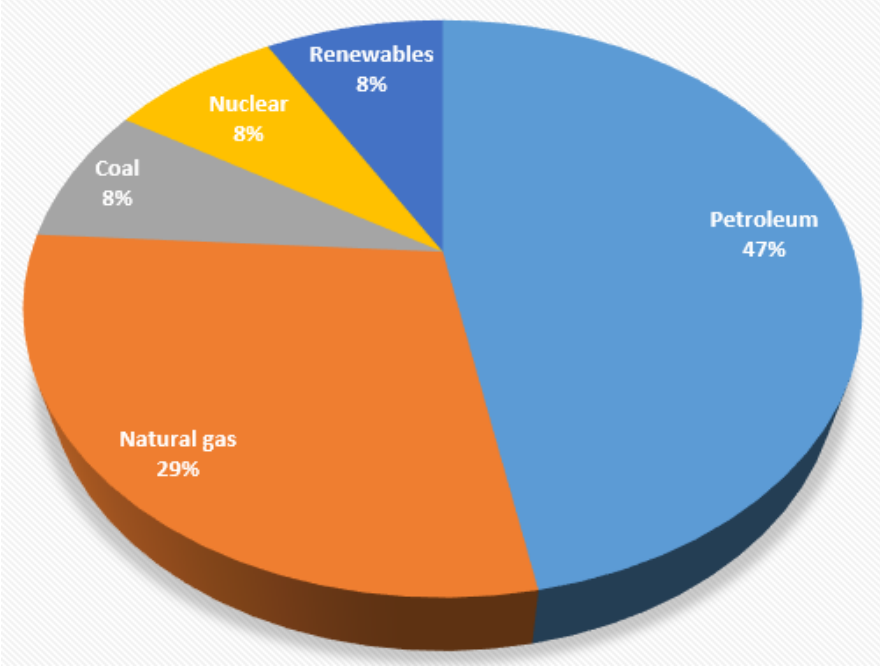

Figure 4: Pie Chart illustrating the Final Energy Consumed in the UK, 2015. ***Source: Adapted from BEIS, 2017 data.***

As Figure 4 indicates, petroleum was the main technology used in 2015, followed by natural gas, and some distance away, coal, nuclear and renewable energy. Considered together, petroleum and natural gas accounted for more than three-quarters of the final energy consumed ((76%) in the UK that year (BEIS, 2017). Viewed through the lens of institutional theory, this suggests that the consumption of fossil fuels in the UK is highly institutionalised due to its scale and widespread usage (Dacin and Dacin, 2008; Zucker, 1991). The scale of its use also suggests that its practitioners are the dominant, central players in the field of energy provision, whereas renewable energy practitioners are the peripheral, dominated actors (DiMaggio, 1983). Being the dominant actors in the field, it is unlikely that fossil fuel players would envision and promote institutional change (Greenwood *et al.*, 2002), but instead create a social structure that establishes and sustains an institutional logic that favours their interests (Greenwood and Suddaby, 2006). Conversely, due to being the dominated, peripheral actors, renewable energy practitioners were more likely to envision change and try to reconfigure institutional arrangements by practising as institutional entrepreneurs (DiMaggio, 1988). Since the final consumption of coal had decreased by over eighty-seven per cent and renewable energy had increased by over seven per cent in the thirty years study period, this suggests that coal was undergoing a process of deinstitutionalisation, whereas renewable energy was being institutionalised (Greenwood *et al.*, 2002; Scott, 2001; Jepperson, 1991). The data also suggest that because renewable energy only accounted for eight per cent of the final energy consumed its consumption was not pervasive, therefore it was partially, rather than fully institutionalised (Genus, 2012). On the other hand, the considerable growth in its consumption over the thirty-year period suggests the legitimacy (Walker *et al*., 2014; Suchman, 1995) of renewable energy was on the increase, unlike fossil fuels' which was decreasing (since coal is a hydrocarbon fuel).

The UK is heavily reliant on imported fuels for its energy provision (ONS, 2017a). Although there has been a steady fall in the energy consumed since 1998, in recent years there has been an upward trend in the reliance on imported energy, which presents the potential threat of an energy gap of 55% by 2025 (Institution of Mechanical Engineers, 2016). Despite being highly reliant on imported fuels, the domestic energy industries are very important to the UK economy. In 2015, the energy industries contributed 2.5 per cent of GDP, however, this is weak in comparison to its peak of 10.4 per cent in 1982 (BEIS, 2016a). This is not new since the energy industries

have been contributing less than 4 per cent of GDP in most years since 2000 (DTI, 2003). The recent share of GDP at 2.5 per cent was however the lowest in forty years, with this being largely attributed to the decline of oil prices, which fell by as much as forty-five per cent in 2015 (BEIS, 2016a).

Needless to say, fossil fuels are major contributors to the UK's GDP since they account for the largest share of the energy mix. In 2015, the oil and gas subfield provided seventy per cent of the total primary energy consumed in the UK, supported around 333,000 jobs, with an average annual salary of approximately £64,000 and added about £35 billion to the UK's economy (The UK Oil and Gas Industry Association, 2016). Fossil fuels are natural fuels "such as coal or gas, formed in the geological past from the remains of living organisms" (Oxford Dictionaries, 2017a, p.1). Natural gas, in this case liquefied natural gas (LNG) as opposed to biogas, is a "flammable gas, consisting largely of methane and other hydrocarbons, occurring naturally underground (often in association with petroleum) and used as fuel" (Oxford Dictionaries, 2017d, p.1). The UK has had a long history of fossil fuels being its main source of energy provision, with petroleum and solid fuels accounting for 47 per cent and petroleum 44 per cent of the energy mix in 1970 respectively (BEIS, 2016a). This long-term, extensive use is the likely source of its entrenchment, subsequently institutionalisation (Greenwood *et al.*, 2002; Scott, 2001; Jepperson, 1991).

At the end of 2016, electricity was still largely centrally generated in the UK (BEIS, 2017e). Fossil fuels accounted for the largest share of the electricity generation mix (51.5 %); followed by renewable energy (24.4%); nuclear (20.7%) and oil and other technologies (2.9%) (*ibid*, 2017e, p.9). Figure 4 illustrates this. Notably, in 2016, the share of gas increased significantly by 12.9% over the previous year, from 29.5% in 2015 to 42.4% (BEIS, 2017e). This contrasted with distributed electricity, which saw the amount of electricity produced by renewable energy sources decreasing by 1.0 per cent, falling from 83.6 TWh in 2015 to 82.8 TWh in 2016 (*ibid,* 2017e, p.9). Similarly, the amount of electricity generated by coal fell by 59.4% on the previous year (from 22.3% in 2015 to just 9.1% in 2016) (BEIS, 2017). Conversely, electricity generated by nuclear technology increased by 2% over the same period (*Ibid*, 2017f, p.117). Figure 5 illustrates this.

As Figure 5 shows, nuclear is an important technology for electricity generation in the UK. In 2014, the nuclear energy subfield contributed £3.5 billion to the UK economy (ONS, 2016a) and employed 15,500 full-time workers (NIA, 2016).

Nuclear energy is "the energy released during nuclear fission or fusion, especially when used to generate electricity" (Oxford Dictionaries, 2017b, p.1).

Like fossil fuels, nuclear has been a part of the UK energy landscape for some time, with the world's first civil, industrial-scale nuclear power station being opened at Calder Hall, Sellafield, Cumbria, in 1957 (DTI, 2007). At its peak in 1997, 26 per cent of the UK's electricity was generated from nuclear power (BERR, 2008), however, since then there has been a steady decline of the sector (BEIS, 2016a). This suggests that nuclear might have been undergoing a process of deinstitutionalisation during the study period (Greenwood *et al*., 2002; Scott, 2001; Jepperson, 1991), unlike renewable energy, the technology the next section examines.

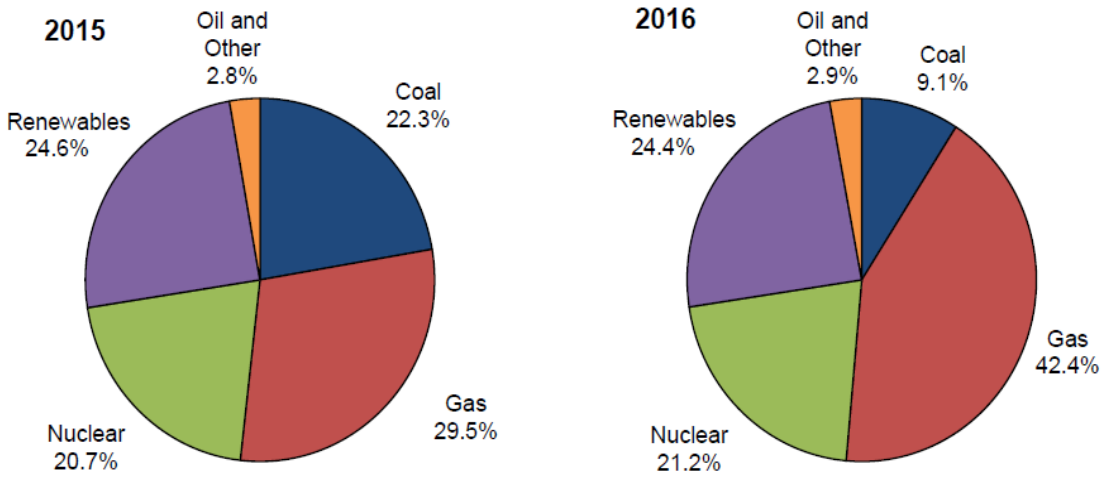

Figure 5: Electricity Generation in the UK, 2015 v 2016. *Source: BEIS, 2017e.*

4.3.2 Renewable energy: A solution?

Renewable energy is a comparatively newer entrant to the field of energy provision in the UK than its fossil fuel counterparts. In 1986, renewable energy provided less than 0.1per cent of the UK's final energy consumed, with the country's first industrial-scale geothermal scheme coming on stream in Southampton that year (DTI, 1998). Since then, the deployment of the technology has grown considerably, contributing some £14 billion to the UK's GDP in 2015, employed 46,800 full-time employees and accounted for 8.3 per cent of the final energy consumed (BEIS, 2016a).

Renewable energy has been variously defined by different authors. One of the first theorists to offer a definition is Sørensen (1979), who describes renewable energy as energy flows which are replenished at the same rate as which they are used. In a not too dissimilar way, Twidell and Weir (1986) theorised that this is a type of energy

obtained from the continuous or repetitive currents of energy recurring in the natural environment. More recently, the Oxford Dictionaries (2017c, p.1) defines renewable energy as "energy from a source that is not depleted when used, such as wind or solar power". Since the Oxford Dictionary's (2017c) definition encapsulates the two offerings, it is that adopted for this thesis. In order to gain an understanding of why renewable energy may be a viable technological (and social) solution for the UK's energy challenges, it is useful to start with the basics. The Renewable Energy Directive lists mainstream renewable energy technologies as (a) wind, solar and hydro energy; (b) bioenergy (energy from combustion of plant and animal matter; (c) waste energy, such as landfill gas, and (d) aerothermal, geothermal and hydrothermal energy (heat from the air, ground and water, respectively) (Parliament UK, 2019).

The main drivers for seeking to replace fossil fuels as the dominant energy source in the UK can be grouped under three broad categories: (1) sustainability problems; (2) environmental problems, and (3) social problems. In the early nineteen seventies, the main worry about fossil fuel usage was the prospect of hydrocarbon fuels running out. The idea of introducing "peak oil" into energy policy debates has its roots in the work of prominent geophysicist, M. King Hubbert, who produced a simple model to show that at the rate at which oil is being used and the world's proven conventional crude oil reserves of 1.1 trillion barrels, "peak oil" would be reached sometime between 2031 and 2068 (Boyle *et al.*, 2003).

Presently, there are several environmental problems which loom large in the public consciousness. One of the most pressing problems is climate change, which is "*a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods*" (United Nations, 1992, p.3). One of the main causes of climate change is excessive greenhouse gas emissions (United Nations, 1992). The single most significant component of greenhouse gas emissions is carbon dioxide (CO_2) released by the burning of fossil fuels (HM Government, 2009). In this regard, coal-fired power stations and transportation have the most deleterious effects (Stern, 2007). Another damaging effect of burning fossil fuels is acid rain, an environmental problem caused by the mixing of sulphur dioxide and nitrogen oxides, which combine with water in the atmosphere to form sulphuric acid and nitric acid (Roger, 2019). These acids have damaging effects on plant life, corrode metals and erode buildings (EPA, 2017). In an equally damaging way, oil also

pollutes the sea. As the scale of oil production increased during the twentieth century, the size of oil tankers has also grown to the point where even during routine operations, large quantities of oil is sometimes released into the sea (Rogers, 2019). As far as energy policy is concerned, currently nuclear and renewable energy are grouped collectively as low carbon technologies. Although this is correct insofar as both technologies producing little or no carbon when used as fuels, nuclear has the main problems of generating radioactive wastes and concerns with the decommissioning of nuclear power plants (von Hippel, 2010).

Some of the main social problems associated with the large scale use of fossil fuels are political and economic tensions due to concentrated reserves and vulnerability due to being centralised. During the early stages of the First Industrial Revolution, fuel tended to be locally sourced and widely distributed (Sørensen, 1979). Industrial activities were generally around suitable rivers which provided water power. As industrialisation developed and spread, fuels started to be transported from more distant places, resulting in major industrialised countries such as the UK being dependent on fuels from faraway places such as the Middle East (Boyle *et al*., 2003). Nowadays, this dilemma is referred to as energy insecurity[8] (IEA, 2019a). One of the main arguments previously used to support the use of fossil fuels for energy production was its facilitation of providing baseload electricity in centralised power plants. Baseload demand is the minimum amount of electric power needed to be supplied to the electrical grid at a given time (Merriam, Dictionary, 2019). Not only has this argument lost its potency because large centralised power stations present themselves as potential targets for terrorist attacks (Knott, 1993), new technologies such as energy storage are making that argument redundant. Through the lens of institutional entrepreneurship theory, collectively these problems can be regarded as some of the exogenous factors (enabling conditions) which might have prompted some actors to try and change the existing institutional arrangements in the field of energy provision (DiMaggio, 1988).

One aspect of energy provision which is especially promising for renewable energy usage is electricity generation (DECC, 2011). In 2016, 24.4% of the UK's electricity was generated by renewable energy (BEIS, 2017e). Figure 6 illustrates the amount of electricity each renewable energy technology generated that year.

[8] Energy insecurity: The potential for the interruption of available energy sources, at affordable prices.

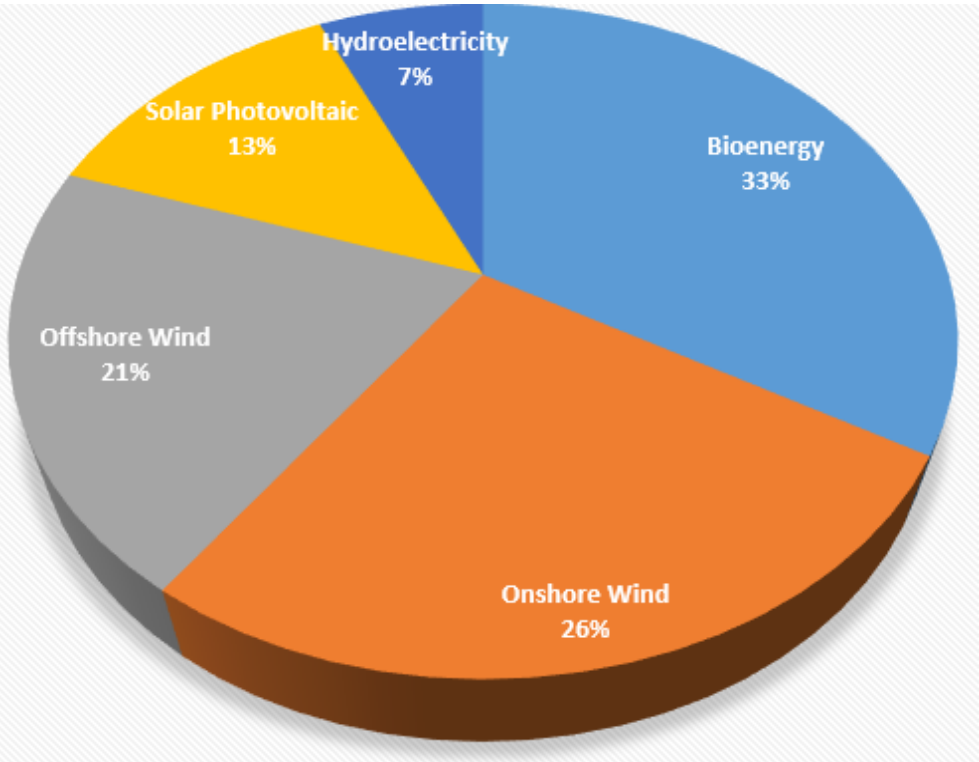

Figure 6: Breakdown of the Amount of Electricity Generated by each Renewable Energy Technology in the UK in 2016. ***Source: Adapted from BEIS, 2017f.***

As Figure 6 shows, bioenergy (including co-firing) provided the majority of electricity generated by renewables in 2016, accounting for 29.6TWh or 33.4%. Bioenergy is defined by the International Energy Agency (IEA) (2019, p.1) as "energy generated from the conversion of solid, liquid and gaseous products derived from biomass". Biomass is "any organic matter", i.e. biological material, available on a renewable basis. This includes feedstock derived from animals or plants, such as wood and agricultural crops, and organic waste from municipal and industrial sources" (*Ibid*, 2019, p.1). It is worthy to note that biomass is a category of solar-derived renewable energy source (Boyle *et al.*, 2003). In the UK, biofuel is the main type of bioenergy used as it is burnt as biomass pellets in large power stations such as Drax to generate electricity. Data suggests that biomass was the most impactful renewable energy technology changing the way energy was provided during the study period, as this was evidenced by the UK going a full twenty-four hours (Friday, 21st April 2017) without using coal-fired power stations to generate its electricity, the first time since the First Industrial Revolution (Hirtenstein and Reierson, 2017). This was mainly due to Drax biomass coming on stream in 2015 (BEIS, 2017). Having said that, this type of biomass has its limitations due to the UK's relatively small landmass limiting the size

of the forests needed to produce the vast amounts of biomass pellets needed for large power stations such as Drax. Further, transporting biomass from North America as feedstock is not truly sustainable because of the considerable distance travelled (CO_2 creation and fossil fuels usage) and is also energy insecure since it is being imported from another country. Biomass used to produce energy from wastes is far more sustainable because the UK's growing population is likely to generate more municipal and industrial wastes as it grows (Defra, 2018). From the perspective of institutional theory, this translates to increasing the cultural-cognitive legitimacy of renewable energy (Deephouse and Suchman, 2008; Dacin *et al*., 2002; Suchman, 1995), since this activity is likely to be perceived by the public as a responsible way of disposing of the UK's waste. Given this, tables 7, 8 and 9 provide the capital costs, levelised cost of energy (LCOE) and the efficiency of the main energy producing technologies, respectively.

Table 7: Capital cost for major electricity generating plants, 2016

Source: Adapted from BEIS, 2016

Plant Type	Capital Cost (£/kW)
Gas/oil combined cycle power plant	808
Coal	2826-3068
Advanced Nuclear	4845
Onshore Wind	1292
Offshore Wind	5249
Solar PV (fixed)	1453
Solar PV (tracking)	1615
Geothermal	2261
Bioenergy (steam cycle boilers)	404-1615
Hydroelectricity	403--3,635

Table 8: LCOE for Projects in the UK, 2016, £/MWh

Source: Adapted from BEIS, 2016

Power generating technology		**Low**	**Central**	**High**
Wind	Onshore	50	67	81
	Offshore	107	121	136
Solar- Large Scale PV		71	80	94
Nuclear- Pressurized Water Reactor		82	93	121
Biomass		85	87	88
Hydro (Pump storage commissioning in 2020)			148	
Marine energy:				
Tidal energy		98	305	382
Wave energy		106	172	228
Natural Gas	Combined Cycle Gas Turbine (CCGT)	65	66	68
	CCGT with carbon capture and storage	102	110	123
	Open-cycle Gas Turbine	157	162	170
Coal	Advanced Supercritical Coal with Oxy-comb. CCS (Integrated Gasification Combined Cycle) with CCS	124 137	134 145	153 171

Guaranteed strike price of £92.50/MWh for Hinkley Point C in 2023

Table 9: Capacity Factors of Various Types of Electricity Generating Plants, 2009-2016. ***Adapted from BEIS, 2017***

Plant type	2009	2010	2011	2012	2013	2014	2015	2016
Nuclear power plants	65.6%	59.3%	66.4%	70.8%	73.8%	66.6%	75.1%	78.1%
Combined cycle gas turbine stations	64.2%	61.6%	47.8%	30.3%	27.9%	30.5%	31.7%	49.6%
Coal-fired power plants	38.5%	40.2%	40.8%	56.9%	58.1%	50.7%	44.0%	21.2%
Hydroelectric power stations	36.7%	24.9%	39.0%	35.7%	31.6%	39.1%	41.0%	34.0%
Bioenergy power stations	56.5%	55.2%	44.1%	46.9%	56.8%	60.1%	67.4%	61.8%
Wind power plants	27.1%	23.7%	30.1%	29.4%	32.2%	30.1%	33.6%	27.8%
Offshore wind power plants					39.1%	37.3%	41.5%	36.0%
Photovoltaic power stations	9.3%	7.3%	5.1%	11.2%	9.9%	11.1%	11.8%	11.0%
Marine (wave and tidal power stations)	4.8%	8.4%	3.8%	8.3%	9.6%	3.2%	2.6%	0.0%

As Table 8 discloses, biomass had a lower LCOE than solar PV, offshore wind, coal and nuclear at Hinkley Point (on completion) in 2016. This suggests that it was more legitimate in that regard (Suchman, 1995). Except for nuclear, biomass was more efficient than the other technologies listed, indicating that it also had a greater legitimacy in this way (Deephouse and Suchman, 2008; Dacin *et al*., 2002; Suchman, 1995).

As gleaned from Figure 6, 21.1TWh or 26.4% of the electricity generated by renewables was by onshore wind, followed by offshore wind at 16.4TWh or 20.5%. It therefore follows, that collectively wind power accounted for the most electricity generated by renewables as this totals forty-seven per cent. Wind power is another form of solar-derived energy that produces electrical energy by harnessing the wind with windmills or wind turbines (IRENA, 2019). In the case of wind turbines, the wind is used to produce electricity by the kinetic energy created by air in motion. To produce electricity, the wind first strikes the blades of the wind turbine, causing them to rotate and turn the generator connected to them. This in turn produces electrical energy through electromagnetism (*Ibid*, 2019, p.1). The UK is one of the best locations for wind power in the world and is considered to be the best in Europe (DECC, 2012; DECC, 2009). As Table 8 shows, at the end of the study period (2016), onshore wind power had the lowest levelised cost[9] per MWh of electricity-generating technologies in the UK when a carbon cost is applied to generation cost (BEIS, 2017). It also surpassed coal in electricity generation for the first time (Vaughan, 2017). This suggests that wind is undergoing a process of institutionalisation, whereas coal, deinstitutionalisation (Greenwood *et al.,* 2002; Scott, 2001; Jepperson, 1991). Some of the main arguments used against wind turbines however are bird strikes, noisiness, unsightliness (NIMBY effect) and intermittency i.e. because the wind does not blow all the time it produces electricity sporadically (Ferrari, 2019). On the other hand, the efficiency of offshore wind had surpassed that of coal and hydroelectricity in 2016 (see Table 8). This suggests that technologically, offshore wind power had greater legitimacy (Deephouse and Suchman, 2008; Dacin *et al*., 2002; Suchman, 1995).

In 2016, solar photovoltaic generated 10.3TWh of electricity or 12.9% of the total electricity produced by renewables (BEIS, 2017f). Solar photovoltaic (PV) is a form of renewable energy technology that converts sunlight (solar radiation) into direct current electricity by using semiconductors (NEF, 2019). Despite being famously overcast, the UK has a relatively good annual solar insolation as Figure 3 illustrates (see solar irradiance map of the UK). According to the DOE (1989), several, very large grid-connected PV power stations, occupying about 2.5% of the UK land area, could

[9] The levelised cost of energy is one of more influential decision-making factors for large-scale energy deployment as it allows for a comparison of the different technologies used for electricity generation on a consistent basis, and is based on the net present value of the unit-cost of electrical energy over the lifetime of the generating asset.

in principle supply 300 TWh of electricity annually, just under the total electricity produced in the UK in 2015 (DoE, 1989). As DECC (2012) usefully explains however, PV modules and inverters account for more than half of the final cost of an installation, therefore a reduction is needed in capital costs to make it as legitimate (Suchman, 1995) as its competitors. As table 8 shows, solar PV had a higher capital cost than most of the other renewable energy technologies and is also more inefficient (BEIS, 2016). Variability is a major constraint of solar PV because the sun does not shine all the time (Boyle *et al.*, 2003). This indicates that in terms of cost and efficiency, solar PV is less legitimate than its renewable energy counterparts (Deephouse and Suchman, 2008; Dacin et al., 2002; Suchman, 1995), however, it is more legitimate than coal and nuclear in relation to costs (see Table 8). Nevertheless, it must be conceded that solar PV is less technologically legitimate (Deephouse and Suchman, 2008; Dacin et al., 2002; Suchman, 1995) than most energy-producing technologies (see Table 8).

As Figure 6 illustrates, hydroelectricity generated 5.4TWh or 6.8% of the total electricity produced by renewable energy technologies in the UK in 2016 (BEIS, 2017f). This contrasts significantly with 1986 when natural flow hydroelectricity accounted for the majority of electricity generated by renewable energy sources, with the contribution of onshore wind; offshore wind and solar photovoltaic being considerably less (BEIS, 2017g). Hydroelectricity is electrical energy produced from water power (Bard, 2017). Traditionally, most large-scale hydroelectric schemes are based on the dam system which involves the damming of large rivers to make reservoirs (*ibid*, 2017, p.8). When the water is released, the pressure in the dam forces the water down pipes that lead to turbines, which they subsequently turn to generate electricity (Boyle *et al*., 2003). Although some rivers in the UK s are suitable for such a system, these are mainly concentrated in Scotland. On the other hand, there are several smaller rivers dispersed throughout the UK which are suitable for run-of-the-river hydroelectricity schemes (e.g. Archimedean Screw micro-systems). Run-of-the-river systems are capable of generating electricity without the need to dam rivers because they use the natural flow rate of water to turn their turbines to generate electricity (Bard, 2017). While these schemes tend to cause less environmental damage, they have the main drawback of having little or no storage capacity (IRENA, 2017). Nevertheless, according to the British Hydropower Association (2018), at the end of 2016, there was an installed capacity of 1676 MW of hydropower in the UK,

with a remaining viable potential of 2 GW. Hydroelectricity is one of the most technologically competitive renewable energy technologies because its capacity can be several times that of conventional power stations (Boyle *et al.*, 2003). It is also highly reliable, efficient, long-lasting and very controllable (British Hydropower Association, 2018). However, some of the larger schemes have considerable environmental and social impacts (Boyle *et al*., 2003).

Four mature renewable energy technologies which did not generate enough electricity to make the 2016 list, but are mentioned in the 2009 National Renewable Energy Action Plan (NREAP), are geothermal energy; marine energy; aero-thermal energy and anaerobic digestion (AD). Geothermal energy is energy produced by heat derived within the sub-surface of the earth (IRENA, 2019a). Three important characteristics are necessary for geothermal power plants: (1) an aquifer that contains water that can be accessed by drilling; (2) a cap rock that retains the geothermal fluid/gas, and (3) a heat source (Boyle *et al*., 2003). In sum, geothermal power stations generate electricity by extracting hot water or steam from the earth through a series of wells to drive electricity-generating turbines (IRENA, 2019a). Geothermal power plants have the main pros of not being dependent on weather conditions and very high capacity factors, subsequently, they are capable of supplying baseload electricity (*ibid*, 2019a, p.1). Although this suggests that geothermal energy for large-scale electricity schemes has a high level of legitimacy (Deephouse and Suchman, 2008; Dacin *et al.*, 2002; Suchman, 1995), in the case of the UK, installations tend to be limited to small ground source heat pumps (DECC, 2011).

In a model created by DECC (2011), it has been forecasted that non-domestic ground source heat pumps alone could contribute up to 14 TWh by 2020. In its simplest form, domestic ground source heat pumps work by pipes being buried in peoples' gardens to extract heat from the ground (Energy Saving Trust, 2019). Typically, a ground loop is buried underground at a depth of between 1.0m – 2.0m for horizontal loop systems (IGSHPA, 2007) to absorb heat from the ground at low temperature into a fluid (Energy Saving Trust, 2019). The fluid then passes through a compressor that raises it to a higher temperature for heating appliances such as underfloor heating systems and hot water circuits in the home (*ibid*, 2019, p.1). In order to increase the uptake of ground source heat pumps, DECC introduced the non-domestic renewable heat incentive (RHI) in 2011(DECC, 2011) and domestic RHI in 2014 (Ofgem, 2017b). This boosted its legitimacy considerably (Suchman, 1995), however, ground

source heat pumps have a relatively high capital cost (between £9,000-16,000 for a typical installation) and require suitable ground for digging or drilling (Energy Saving Trust, 2019). These two factors undermine its legitimacy somewhat (Deephouse and Suchman, 2008; Dacin et al., 2002; Suchman, 1995).

Marine energy is defined by the European Science Foundation (2010, p.3) as "*renewable energy production which makes use of marine space*". The main types of marine energy are wave, tidal stream, tidal range and offshore wind (EMEC, 2019). The UK has significant potential for utilising this resource, because as DECC (2011) points out, 27 GW of wave and tidal stream capacity could be deployed in the UK by 2050, assuming a high deployment scenario. Tidal energy is the result of the gravitational pull of the moon, and to a lesser extent, the sun, on the seas (Boyle *et al.*, 2003). This differs from hydropower which is derived from the hydrological climate cycle (Bard, 2017). One of the most ambitious tidal power schemes proposed for the UK is the Severn Barrage. This scheme is based on the upstream flow of an estuary being trapped behind a barrage. The incoming tide is allowed to pass through the sluices, which are closed at high tide to trap the water behind them. When the tide ebbs, the water level on the upstream side is reduced, causing a head of water to develop across the barrage. The head then drives the water through turbine generators to generate electricity (Boyle *et al.*, 2003). Tidal stream schemes work on a similar principle to wind turbines, however, they use water instead of the wind to push the rotors of the turbines. Tidal stream schemes have a moderate level of legitimacy (Suchman, 1995) because while their relatively low cost and environmental impact is desirable, corrosion can be problematic, thus making them difficult to maintain.

Interestingly, the UK Renewable Energy Roadmap opens by pronouncing that the "*nations of the United Kingdom ……have the best wind, wave and tidal resources in Europe*" (DECC, 2011, p.3). Later it discloses that although there were no commercial deployment at the time (2011), 300 MW (approximately 0.9 TWh) of tidal stream and wave energy devices could be deployed in the UK by 2020 (*ibid*, 2011, p.58). Wave energy is a concentrated form of solar power that is generated by the action of the wind blowing across the surface of the seawater (Greaves and Iglesias, 2018). The main types of wave power devices that can be used to generate commercial electricity fall into three broad categories: (1) shoreline devices; (2) near-shore devices, and (3) offshore devices (Pecher and Kofoed, 2016). Shoreline devices are fixed to or embedded in the shoreline and generate electricity using a range of devices

(*Ibid*, 2016, p.22). If an Oscillating Water Column (OWC) shoreline device is used, electricity is generated by the rotation of the turbine caused by trapped air captured in the hollow column of the partially submerged device- one end of the column opens to the sea (EMEC, 2019). Near-shore devices are located near to the breaker zone and create electricity by extracting the wave power directly from the breaker zone and the waters immediately beyond the breaker zone- at a water depth of about 20m (*ibid*, 2019, p.1). Offshore wave energy devices extend beyond the breaker lines and are farthest out at sea (Pecher and Kofoed, 2016). They generate electricity by utilising the higher power wave profiles and high-energy densities available in deep water waves and surges (Greaves and Iglesias, 2018). Despite having great potential, the deployment of wave energy devices in the UK is negligible because they were still in their infancy at the end of the study period and were very expensive due to not yet being institutionalised (Greenwood *et al.*, 2002; Scott, 2001; Jepperson, 1991).

Another renewable energy technology that holds considerable potential for providing some of the UK's energy is aerothermal. According to NREAP, aerothermal technologies could contribute 1,301 ktoe of the UK's final energy consumed in 2020 (Cabinet Office, 2009e). "*Aerothermal energy is thermal energy (from the sun) that a thermodynamic heat pump draws from the surrounding air and then transfers to a heating system, using the same principle as a geothermal heat pump*" (Futura-Science, 2019, p.1). Of the various aerothermal technologies that are being targeted to help meet the UK's 2020 renewables objective, air-source heat pumps (ASHPs) are those being promoted the most. To support this claim, the 2011 Renewable Energy Roadmap predicts that air source and ground source heat pumps could provide 16-22 TWh of energy in 2020 (DECC, 2011). ASHPs work by transferring heat from the outside to the inside of a building and *vice versa*, using the principle of vapour compression refrigeration (Hundy *et al.*, 2016). In domestic heating systems, an ASHP absorbs heat from the air on the outside into a liquid within the unit at low temperature (Ochsner, 2012). The heat pump compressor within the unit then raises the temperature of that heat (*ibid*, 2012, p.368). The heat of the hot liquid is transferred by the compressor to appliances such as underfloor heating installations; hot water-filled radiators; domestic hot water supply, or, it directly releases the air into the inside of the building (Hundy *et al*., 2016). Despite needing electricity to run, an ASHP generally uses less electrical energy than the heat it produces (Ochsner, 2012). To overcome this constraint, an ASHP system can be integrated with a solar PV unit or any other renewable technology

that produces electricity. One of the main challenges of ASHPs is that they are more expensive to purchase and install than fossil fuel heating systems (Song and Shiming, 2019), however, air to water ASHPs are eligible for the RHI subsidies (Ofgem, 2019c).

Another key renewable technology which is being targeted for deployment in the UK is Anaerobic Digestion (AD). AD is the process of breaking down organic material by micro-organisms in the absence of oxygen (NNFCC, 2019). It involves transforming many different vegetable and animal substances into biogas, a methane-rich gas (da Rosa, 2005) which can be used like natural gas to generate energy for electricity, heat and transport (HM Government, 2009). AD is regarded as an efficient way of refining biomass (da Rosa, 2005) and was therefore seen by the UK Government as an important contributor to the country meeting its renewable energy objectives (HM Government, 2009). According to the UK National Renewable Energy Strategy, AD can be used by the water industry to process sewage sludge; on farms to process animal slurries and other agricultural residues; and to process food waste that would otherwise go to landfill (*ibid*, 2009, p.104). Further, "*there is currently much unused biomass waste and the UK is taking steps to produce bioenergy from this resource, particularly through combustion and from the anaerobic digestion of food waste, agricultural waste and sewage to produce biogas.*" (Cabinet Office, 2009, p.143).

Other proven renewable technologies which did not make the list and/or were not included in the NREAP, are solar concentrators; solar water heating systems; biofuels; ocean thermal; fuel cell technology and hydrogen energy. While these technologies may someday play a role in the UK being a low-carbon country, they are not yet sufficiently mature or commercially viable/competitive to be covered by this thesis. These technologies aside, this section has examined the various renewable energy technologies from a technological perspective. It shows that of all renewable technologies, bioenergy, specifically biomass, had the highest degree of legitimacy (Suchman, 1995) because of its high efficiency (61.8%); competitiveness (£87/MWh) and suitability for providing baseload electricity. However, biomass was less legitimate than nuclear in terms of efficiency (nuclear-78.1% CP). It was also less legitimate than onshore wind (£67/MWh); large-scale solar PV (£80/MWh) and natural gas (£66/MWh) in terms of cost. Onshore wind was the most legitimate of all technologies in terms of cost (£67/MWh), however, it was less legitimate than nuclear, natural gas and bioenergy in relation to efficiency. Another notable observation was

that solar PV and wind power were progressively getting more legitimate, both in terms of efficiency and cost as time progressed. In summary, the analysis has shown that technologically most of the renewable energy technologies had advanced to the stage of either being more viable, as viable, or almost as viable as their fossil fuel counterparts.

Considered together, the factors identified so far can be regarded as the opportunities and constraints which might have made the UK fertile ground for institutional entrepreneurship to take root. After all, institutional entrepreneurs are opportunistic (DiMaggio, 1988), constraint escaping actors (Leca *et al*., 2008) who seek to change the way things are in organisational fields (DiMaggio, 1988). For them to do so however, there must have been some trigger which motivated them to act. Given this, the rest of the chapter examines the field of energy provision in the UK during the study period to see what critical events might have contributed to changing the way energy is provided; those who may have responded to those events to try and change the way things were and the institutionalisation activities they may have engaged in to develop the renewable energy subfield. Table 10 that follows provides a chronological account of the key events which may have led to the establishment and development of the renewable energy subfield in the UK, while section 4.4 examines the table more closely to see which critical events might have led to, or contributed to, shaping the renewable energy subfield during the period 1986-2016.

Table 10: Key Events in the Field of Energy Provision during 1986-2016 which might have led to the Creation and Institutionalisation of the Renewable Energy Subfield in the UK.

Year	Events
1986	The liberalisation of the energy market begins in the UK. The Department of Energy (DoE) has the main responsibility for its liberalisation. British Gas privatised. The Office of Gas Supply (Ofgas) established to regulate the gas sector. The UK's first geothermal district heating network scheme comes on stream in Southampton. Renewable energy accounts for less than 0.1% of the UK's final energy consumed.
1987	The UK's first commercial wind turbine starts supplying electricity to homes on Orkney.
1988	European Commission's Large Combustion Plant Directive (LCPD) launched to address national and trans-boundary environmental damages caused by acid deposition. Government Energy Paper 55 (1988) proposes cutting back on support for research and development in renewable energy to zero by 2000. Transport became and remains the largest consumer of energy in the UK.
1989	Electricity Act 1989 enters into force to provide the legal framework for the privatisation of the Electricity Supply industry. Fossil Fuel Levy (FFL) imposed on electricity generated from fossil fuel sources. The Office of Electricity Regulation (OFFER) established. The UK begins collecting renewable energy statistics.

1990	The Non-Fossil Fuel Obligation (NFFO) introduced to meet the mandate of the LCPD. The NFFO obligated DNOs in England and Wales to purchase electricity from nuclear power and the renewable energy sectors. 1.3% of the UK's electricity produced from renewables. NFFO used as a financing instrument to fund the extra cost of nuclear power and new renewable energy projects. Electricity Supply industry privatised. "Dash for gas" era begins.
1991	The UK's first commercial onshore wind farm opens in Delabole, Cornwall. Consisting of 10 turbines, the farm produced enough energy to power 2,700 homes.
1992	DOE dissolved and replaced by the Department of Trade and Industry (DTI). Many of the functions of the DOE transferred to departments such as the Office of Gas Supply (Ofgas) and the Office of Electricity Regulation (OFFER). UN Framework Convention on Climate Change (UNFCCC) passed. Energy Savings Trust established by the UK Government to promote energy efficiency, energy conservation and the sustainable use of energy. World Renewable Energy Network (WREN) established in Reading to support and enhance the utilisation of renewable energy sources.
1993	Blyth Harbour comes on stream. Consists of nine 0.3 MW WindMaster turbines with a total installed capacity of 2.7 MW.
1994	Government decides to cut back on research and development for renewable energy technology.
1995	Triodos Bank sets up Wind Fund plc, one of the UK's first equity based funding vehicles for renewable energy ventures. 2.17% of the UK's electricity generated from renewables.

1996	Privatisation of the electricity industry completed. Ecotricity founded- becomes the first renewable energy company to supply eco-friendly gas to customers in 2010. Fossil Fuel Levy imposed in Scotland.
1997	Kyoto Summit held to address climate change. Winter Fuel Payments for the over-60s was introduced. Baywind Energy Co-operative becomes the first UK co-operative to own wind turbines.
1998	1998 White Paper launched to specify stricter consents policy to protect security of supply and energy diversity. Domestic gas market opened up to competition.
1999	Domestic electricity market opened to competition. OFFER and OFGAS merged to create Ofgem, the chief government regulator for the electricity and natural gas markets.
2000	Competition Act comes into force. The Climate Change Levy, under the Finance Act 2000, imposes a levy on polluting technologies through energy bills, with renewables and good CHP being excluded. Utilities Act 2000 established to supersede the Gas Act 1995 and Electricity Act 1989. 2.61% of the UK's electricity generated from renewable energy sources.
2001	European Union Renewable Directive (RD) comes into force- sets targets for Member States to provide 12% of energy from renewables by 2010. New Electricity Trading Arrangements (NETA) launched. EU National Emission Ceilings Directive 2001/81/EC (NECD) passed.

2002	UK agrees under the Kyoto Protocol to reduce 12.5% greenhouse gas emissions within the period 2008-2012 Renewables Obligations (RO) introduced in England, Wales and Scotland- regulatory measure aimed at increasing renewable electricity generation primarily from large scale professional energy companies. Major Photovoltaic (PV) Demonstration Programme launched by the Energy Savings Trust- UK Government initiative for those interested in installing PV modules to generate micro-electricity- also a certification scheme. 4 MW of offshore total capacity of installed wind power in UK waters.
2003	2003 Energy White Paper *"Our energy future-creating a low carbon economy*" published. The Sustainable Energy Act 2003 replaces the Utilities Act 2000. The UK's first major offshore wind farm commenced operation in North Hoyle, Wales. Consisting of 30 Vestas V80, the farm produced enough electricity to power 50,000 homes. Clear Skies launched by BRE Global- programme introduced by the UK Government to support the growth of small scale, onsite renewable technologies. EU Renewable Directive 2003 replaces EU RD 2001.
2004	Bioenergy Infrastructure Scheme launched. Financial incentive applicable to SME producers of biomass in England who supply to consumers in the UK. The first community energy scheme becomes operational in Woking.
2005	European Union Emissions Trading Scheme (EU ETS), the world's first and largest greenhouse gas emissions trading system established by the EU.

	ROCs replace NFFO. ROCs are certificates issued to operators of accredited renewable generating stations for eligible renewable electricity.
	1.5% of the UK's final energy consumed supplied by renewables.
	3.59 % of the UK's electricity generated from renewable energy sources.
2006	2006 Energy Review published.
	"*Our Energy Challenge"* published- policy document setting out the strategy for microgeneration technologies.
	Low Carbon Building Programme (LCBP) (Phase 1) launched by the Energy Savings Trust- a scheme that offered grants for installing domestic microgeneration technologies. `
	The Major PV Demonstration Programme is closed.
	Renewable Energy Consumer Code (RECC) launched by the Renewable Energy Association (REA) as a set of standards for selling and leasing small-scale heat and power generated from renewables and other low carbon sources.
	Currys starts stocking solar PV and provides installation service.
	12 MW installed capacity of solar PV.
2007	DTI dissolved and replaced by the Department for Business, Enterprise and Regulatory Reform (BERR).
	EU Renewable Energy Directive 2007 agreed, obligating the EU to supply 20% of its energy from renewable energy sources by 2020.
	Energy Crops Scheme (ECS) launched.
	LCBP (Phase 2) launched by BRE Global.
	Rural Development Programme for England 2007-13 (RDPE) introduced.
2008	Climate Change Act 2008 passed.

	The Department of Energy and Climate Change (DECC) established to take responsibility of the UK energy portfolio. Renewable Transport Fuel Obligation (RTFO) introduced- Regulatory mechanism aimed at increasing the proportion of renewable fuel in road fuel. Clear Skies is closed. Microgeneration Certification Scheme launched by Gemserv Ltd- a quality assurance, and later a certification scheme, to progress the microgeneration industry, raise awareness and address perceived marketplace opinion on microgeneration technologies. World's first large scale commercial 1.3 MW tidal stream plant installed in Strangford Narrows, N.I.
2009	BERR disbanded and replaced by the Department for Business, Innovation and Skills (BIS). UK Renewable Energy Directive 2009/28/EC passed by the UK Government to meet EU stipulated target of at least 15% of the UK's energy being supplied by renewables by 2020. The Office for Renewable Energy Deployment (ORED) established. *"The UK Renewable Energy Strategy"* published. Community and Renewable Energy Scheme introduced to provide grants of up to 150k. Green Energy Act launched to promote the development of "green energy". EU Renewable Directive 2009 replaces EU RD 2003. 2.4% of the UK's final energy consumed supplied by renewables.

2010	Feed-in Tariffs (FITs) introduced by DECC- financial incentive aimed at incentivising low-carbon electricity from a range of small scale renewable energy technologies. Energy Act 2010 comes into force. Drax Power Station starts co-firing biomass. Austerity measures introduced in response to the 2008 financial crisis. LCBP closed. 3.2 % of the UK's final energy consumed supplied by renewable energy. 3.59 % of the UK's electricity generated from renewable energy sources.
2011	DECC introduced the non-domestic Renewable Heat Incentive (RHI) to replace LCBP- government financial incentive aimed at increasing renewable heat generation from a range of technologies. Coalition Government cuts FIT support for PV installations greater than 50kW. 3.8% of the UK's energy provided by renewables. The UK's first renewable energy roadmap published. First solar park in Wales comes on stream. Construction of the then-largest solar park in the UK completed in Nottingham.
2012	UK Green Investment Bank plc created by the UK Government to back green projects on commercial terms and mobilise private sector capital into the green economy. Coalition Government slashes the value of the FIT. Green Deal launched. 1,000 MW installed capacity of solar PV in the UK.

2013	Energy Act 2013 comes into force, with the Contracts for Difference (CfD) and Capacity Market (CM) being integral components.
	Electricity Market Reform (EMR) launched via the Act, as a Government programme that responds to the energy trilemma facing the UK.
	Publication of the Renewable Energy Roadmap discontinued.
	Energy Bill 2012-2013 agreed- aims to close all coal-fired power stations by 2025.
	At the end of year 4 of the FIT, 2,386 MW capacity confirmed.
	The first of three power generating units at Drax upgraded to use biomass.
	Second wave of austerity measures introduced.
2014	Domestic Renewable Heat Incentive (Domestic RHI) introduced- Government financial incentive aimed at promoting the use of renewable heat.
	The second power generating unit at Drax upgraded to biomass.
	The European Commission awards Drax €300 million in funding to support the White Rose Carbon Capture and Storage (CCS) project.
2015	New FIT rate of 4.39p/kWh for domestic-scale solar comes into force.
	Mark Group enters into administration with the loss of 900 jobs.
	Work undertaken at Drax to upgrade a third coal-fired unit to run on biomass, making the power station the UK's first majorly biomass-fuelled power plant. Hundreds of jobs created as a result.
	Drax decides not to make any further investment in the CCS scheme because of a lack of government support for renewable energy.
	Lightsource Renewable Energy becomes the first renewable energy firm in the UK to have an operational portfolio of 1gW of solar PV.

	8.3% of the UK's final energy consumed supplied by renewables. 24.6% of the UK's electricity was generated by renewable energy.
2016	DECC merged with the Department for Business, Innovation and Skills to form the Department for Business, Energy & Industrial Strategy (BEIS). Northern Ireland green scandal- Northern Ireland RHI Scheme suspended; portfolio losses in Northern Ireland's parliament. More electricity produced from solar PV than coal for the first time. Coal not used to generate electricity for an entire day for the first time since the First Industrial Revolution- largely due to the third biomass unit coming on stream at Drax the previous year. Drax announces that it intends to build four new open cycle gas turbine power stations – two in England and two in Wales. The FIT scheme was paused from 15 January to 7 February 2016 (inclusive) and a deployment cap was imposed on all technologies. 12.9% of the UK's final energy consumed supplied by renewables. 24.4% of the UK's electricity was generated by renewable energy- 0.2% down on the previous year.

4.4 CRITICAL EVENTS IN THE FIELD OF ENERGY PROVISION, 1986-2016

Following the lead of Child *et al*., 2007; DiMaggio, 1991 and North 1990, this section sifts through Table 10 which closed the previous section to identify the critical events which might have contributed to shaping the renewable energy subfield during the period. Critical events are field-level conditions (DiMaggio, 1991) such as shocks (Fligstein, 1991); jolts (Meyer, 1982) or disruptive events such as new legislation (Hoffman, 1999) that are capable of overcoming institutional inertia (Child *et al*., 2007). Given this, pinpointing critical events is an appropriate way of identifying the motivation for change in an organisational field (DiMaggio, 1991). An examination of Table 10 indicates that three critical events might have served as motivators for change in the field of energy provision during the study period: (1) the liberalisation of the energy market (1986- 1996); (2) a period of environmental protection (1988-2008); and (3) the introduction of the UK Renewable Energy Directive 2009/28/EC (2009). The rest of this section now unpacks each.

The liberalisation of the UK energy market which spanned the period 1986-1996 might have been a critical event because it removed the coercive apparatus of the state (Scott, 2001), thus opening up the field of energy provision for new entrepreneurial activities. Before 1986, energy provision in the UK was a highly institutionalised field (DiMaggio, 1991) regulated by the state. As the dominant player (Greenwood and Suddaby, 2006), the state had monopolistic control and might have used its systemic power (Stone, 1980) and agency (Dacin *et al*., 2002) to control how things were done in the field. In other words, before liberalisation, institutional arrangements in the field of energy provision were tightly coupled around state control. This might have limited entrepreneurial activities as private actors were not allowed to enter into the field to spawn new field ideas and engage in entrepreneurial activities (DiMaggio, 1988). Since the field was monopolised by the state, it is likely that it had been structured (Giddens, 1984) to suit its best interest (DiMaggio, 1988) and maintain the *status quo* (Lawrence and Suddaby, 2006). This is evidenced by the state primarily introducing the NFFO as a regulative institution (Scott, 2001) to subsidise the nuclear sector (Defra, 2011). By opening the door to new field entrants, liberalisation enabled the free-market (North, 1990) to decide its fate and allowed the entry of a fresh set of actors to introduce new ideas and ways of doing things (DiMaggio, 1988). The successful privatisation of the energy market in 1996 bears testament to this, since the

liberalisation of the energy market had overcome institutional inertia to achieve its goal of deinstitutionalising state control of the UK energy market (Jepperson, 1991).

The second critical event that could have contributed to shaping the renewable energy subfield in the UK is a period of environmental protection which spanned the years 1988-2008. Technologically, environmental protection is a way of solving an environmental problem by introducing laws, responsibility norms and policies to curb and constrain environmental degradation (Child *et al*., 2007). Two major trans/international environmental protection mechanisms were identified in Table 10 which led to the introduction of key national environmental protection instruments: (1) The Large Combustion Plant Directive (LCPD) (1988) and (2) the UN Framework Convention on Climate Change (UNFCCC) (1992). The thesis now examines each.

The Large Combustion Plant Directive (LCPD) was launched in 1988 by the European Commission to address national and trans-boundary environmental damages caused by acid deposition (Defra, 2011). As a regulative institution (Scott, 2001), the LCPD coercively obligated EU Member States to legislatively limit flue emissions from combustion plants having a thermal capacity of 50 MW or more (Defra, 2011). Since the basis of legitimacy of regulative institutions is legal sanctioning (Scott, 2001), the NFFO was launched as a response in 1990 under the powers of the Electricity Act 1989 (Defra, 2011). The NFFO obligated DNOs in England and Wales to purchase electricity from nuclear power and the renewable energy sectors (*ibid*, 201, p.). In order to fund the initiative, the Non-Fossil Purchasing Agency (NFPA) was formed by public electricity suppliers to receive the funds collected on its behalf by OFFER, which is likely to have strengthened its normative pillar (Scott, 2001) because a dedicated body had this role. To shore up its cultural-cognitive dimensions (Scott, 2001), NFPA theorised (Greenwood *et al*., 2002) by pitching coal as a "dirty", polluting technology and proposed low carbon technologies such as nuclear and renewable energy as better alternatives. This sealed the fate of coal-fired power stations in the UK as this discourse was critical to its deinstitutionalisation (Greenwood *et al*., 2002). The use of coal for electricity generation was further delegitimised (Suchman, 1995) as a tax was imposed on coal-derived electricity if the non-fossil power cost more than the fossil-derived electricity (Defra, 2011).

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty passed in 1992 (United Nations, 1992) and came into force in 1994 (UNFCCC, 2019). Its main objective is to stabilise *"greenhouse gas*

concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (United Nations, 1992, p.4). The UK became a signatory on June 12, 1992 (UNFCCC, 2019) and was therefore obligated to "*enact effective environmental legislation*" (*ibid*, 1992, p.1). Since the UNFCCC is an international environmental treaty, it is the set of rules, norms and standards that establishes the normative guidelines and common conceptual framework that needs to be followed to achieve the above-stated environmental goal. As such, it is both a regulative and normative institution (Scott, 2001). The treaty is a regulative institution because it is enshrined in law (Scott, 2001) and a normative institution because the limits it sets on greenhouse gas emissions for individual countries is non-binding and the framework itself does not have any enforcement mechanisms (United Nations, 1992). Being a regulative institution, its basis of compliance is expedience (Scott, 2001), consequently it spawned a raft of major environmental control mechanisms such as the Kyoto Protocol in 2002 (at an international level); EU ETS (2005) and EU Renewable Energy Directive 2007 (at a transnational level); and the Climate Change Act in 2008 (at a national level), *inter alia*. As a normative institution, it places a moral duty on society to act appropriately to ensure that its goals are met, however, this is highly reliant on its goals (and by extension the state mechanisms introduced to achieve those goals e.g. Climate Change Act 2008, etc.) being considered legitimate (Suchman, 1995) and the norm (Scott, 2001). Environmental protection might have been a critical event that contributed to shaping the renewable energy subfield because it overcame institutional inertia to spawn impactful legislation such as the Renewable Energy Directive 2009/28/EC.

The final critical event which might have contributed to shaping the renewable energy subfield was the launch of the UK Renewable Energy Directive 2009/28/EC. The Directive is a legislative instrument that obligates the UK to source 15% of all its energy and 10% of transport fuels from renewables by 2020 (Parliament UK, 2019). The targets were further aggregated to 30% renewable electricity; 12% renewable heat and 10% renewable transport (*ibid*, 2019, p.1). Although it might be argued that the Directive was launched to assist the UK in meeting its objectives under the Climate Change Act 2008 (and by extension the UNFCCC- therefore it should be regarded as an environmental protection mechanism), the data suggest that it might have motivated considerable change after its introduction. Before the introduction of the Directive, the promotion of renewable energy in the UK was largely piecemeal, with several

organisations being responsible for this (e.g. Clearview; the Energy Savings Trust, etc.). On its launch in 2009, DECC had the responsibility of ensuring that the Directive met its 2020 target and ORED was specifically formed to promote the deployment of renewable energy in the UK. To facilitate its goals being met, several supportive institutions (Scott, 2001, North, 1990) such as the Feed-in Tariffs (2010); the non-domestic Renewable Heat Incentive (2011) and the UK Green Investment Bank plc were established to incentivise the take-up of renewable energy (see Table 10). Since the UK Renewable Energy Directive 2009/28/EC overcame institutional inertia to achieve its goal of spurring the uptake of renewable energy, it is worthy of being classified as one of the critical events which might have contributed to shaping the renewable energy subfield during the study period. The description of the UK Renewable Energy Directive 2009/28/EC is extended in section 4.6.

4.4.1 Summary

This section has shown that the three main critical events which may have contributed to shaping the renewable energy subfield in the UK were the liberalisation of the energy market (1986- 1996); a period of environmental protection (1988-2007); and the introduction of the UK Renewable Energy Directive 2009/28/EC (2009). Not only were these critical events because they had influenced the path of institutional development for the renewable energy subfield during the period (DiMaggio 1991; Hannan and Freeman 1989; North 1990), they also overcame institutional drag (*Child et al., 2007)*. Having pinpointed the critical events in this section, the next section identifies those who may have been motivated to create new institutional rules in the field of energy provision during the period (DiMaggio, 1988).

4.5 THE RULE MAKERS IN THE FIELD OF ENERGY PROVISION IN THE UK, 1986-2016

This section analyses the data gathered by the analysis of the archival documents (see Table 10) to identify those who may have created the most influential institutional rules during the study period. One of the main factors which distinguishes institutional entrepreneurs from other field members is their characteristic of being rule makers, rather than rule takers (Child *et al*., 2007). While rule makers are those who take the initiative to define the issues and facilitate the emergence of new rules (institutions), rule takers are those who must follow and adopt the new practices (*ibid*, 2007, p.1016). Ruler makers are therefore actors who create and institutionalise regulative (rules,

laws, sanctions); normative (certification, accreditation) or cultural-cognitive institutions (social norms, customs or traditions that shape behaviour and thought) (Scott, 2001). Since the dataset used for this analysis is sourced from publications such as national energy policy documents and the ONS records, it mainly allows for identifying the actors who created the regulative and normative institutions. The data gathered by the empirical element of the thesis is far more appropriate for identifying the actors who created the informal and normative institutions, therefore a more comprehensive list of the institutions created by the rule makers is provided in the findings chapter. Table 11 that follows lists some of the most significant regulative and normative institutions created by the rule makers, as gleaned from the information provided by Table 11.

Table 11: List of the Main Regulative Rules, Normative Rules and the Rule Makers during 1986-2016

REGULATIVE RULES	NORMATIVE RULES	RULE MAKERS	PERIOD OF EXISTENCE
	Liberalisation of the energy market.	UK Government	1986-1996
	Privatisation of British Gas	UK Government	1986
	Creation of Ofgas	UK Government	1986-1999
LCPD		EU	1988- repealed 2016
	Creation of OFFER	UK Government	1989-1999
Electricity Act 1989		UK Government	1989-2000
Fossil Fuel Levy		UK Government	1989-2002

NFFO		UK Government	1990-2005
	Privatisation of Electricity Supply Industry	UK Government	1990
UNFCCC		UN	1992-ongoing (2016)
	Establishment of WREN	UN	1992-ongoing (2016)
	Creation of Ofgem	UK Government	1999-ongoing (2016)
Finance Act 2000		UK Government	2000-ongoing (2016)
Climate Change Levy		UK Government	2000-ongoing (2016)
Utilities Act 2000		UK Government	2000-2003
Directive on Electricity Production from Renewable Energy Sources 2001/77/EC		EU	2001- 2003
NECD		EU	2001- ongoing, but has had several amendments
RO		Ofgem	2002- ongoing (2016)

	Major Photovoltaic (PV) Demonstration Programme	Energy Savings Trust	2002-2006
EU Renewable Directive 2003		EU	2003- 2009
Kyoto Protocol agreement		UN	2005-ongoing (2016)
Sustainable Energy Act 2003		UK Government	2003- 2006
	Clear Skies	BRE Global	2003-2008
	Bioenergy Infrastructure Scheme	Defra	2004
ROCs		Ofgem	2005-ongoing (2016)
EU ETS		EU	2005-ongoing (2016
	LCBP	Energy Savings Trust	2006- 2010
	RECC	REA	2006-ongoing (2016)
	ECS	Defra	2007-2013
	RDPE	UK Government	2007-ongoing (2016)
Climate Change Act 2008		UK Government	2008-ongoing (2016)
	MCS	Gemserv Ltd	2008-ongoing (2016)

	Creation of DECC	UK Government	2008- closed in 2016
EU Renewable Directive 2009		EU	2009- ongoing (2016)
UK Renewable Energy Directive 2009/28/EC		UK Government	2009-ongoing (2016)
	Creation of ORED	DECC	2009
FIT		DECC	2009- ongoing (2016)
Energy Act 2010		UK Government	2010-2013
	Non-domestic RHI	DECC	2011-ongoing (2016)
	UK Green Investment Bank	UK Government	2011-ongoing (2016)
	Green Deal	DECC	2012-2015
Energy Act 2013		UK Government	2013-2016
	CfD	UK Government	2013- ongoing (2016)
	CM	UK Government	2013-ongoing (2016)
	EMR	UK Government	2013- ongoing (2016)
	Domestic RHI	DECC	2014-ongoing (2016)

As Table 11 shows, the state, its departments (e.g. DECC) and its regulatory agencies (e.g. Ofgem; OFFER; Ofgas, etc.) created most of the institutions during the study period. This is not surprising since the state is more likely to construct the regulative pillar of an organisational field because of its position as government (Stone, 1980), while the various departments and regulatory agencies are likely to create the normative pillar because of their expert knowledge (Child *et al.*, 2007). If that is the case, this suggests that the main institutional entrepreneurs during the period were the UK Government, its various state departments and regulatory agencies. As established by the literature review however (see section 2.6), this single criterion is insufficient for determining if an actor has practised as an institutional entrepreneur, the newly created institutions must have attained the status of being institutionalised (Jepperson, 1991). That is, they must be enduring, pervasive and taken-for-granted (Greenwood *et al*., 2002; Scott, 2001; Jepperson, 1991). Applying this criterion narrows the field somewhat, since some of the institutions (e.g. Electricity Act 1989; Utilities Act 2000, etc.) only lasted for a short period of time, as did some of the organisations (e.g. Clear Skies; Ofgas; OFFER) which became defunct before they attained the status of being institutionalised (Jepperson, 1991). Nevertheless, this dataset provided sufficient evidence to show that the state and its departments might have practised as institutional entrepreneurs because some of the institutions they created (e.g. Ofgem, Climate Change Levy; ROCs; FIT; etc.) had become institutionalised (Greenwood *et al*., 2002; Scott, 2001; Jepperson, 1991), subsequently reshaping the field of energy provision significantly during the period (DiMaggio, 1988).

Although the state and its various departments might have been some of the main rule makers, many of the institutions they had created (e.g. NFFO; Climate Change Levy; UK Renewable Energy Directive 2009/28/EC; etc.) were due to their obligation of meeting EU Directives, due to being a Member State. In a similar way, the EU might have created some institutions (e.g. Climate Change Act) due to its obligations under international treaties such as the UNFCCC. Since many of these institutions may have led to the creation and institutionalisation of the renewable energy subfield in the UK (Greenwood *et al*., 2002; Scott, 2001; Jepperson, 1991), it can be reasonably argued that the EU and the UN may have also been major rule makers, due to having created influential institutions such as the EU ETS; the Renewable Energy Directive; the Kyoto Protocol, the UNFCCC, *inter alia*.

Some of the more effective means through which norms and expectations are conveyed are by the certification; accreditation (Greenwood and Suddaby, 2006; Scott, 2001) and the professionalisation of an organisational field (DiMaggio, 1991). As Table 11 shows, the establishment of organisations such as the Renewable Energy Association; Gemserv and the UK Green Investment Band led to the professionalisation of the renewable energy subfield (Greenwood and Suddaby, 2006). The Renewable Energy Association (REA) for example, launched WREN in 1992 to support and enhance the utilisation and implementation of renewable energy sources which are environmentally safe and economically sustainable (WREN, 2019). In addition to promoting the communication and technical education of scientists, engineers, technicians and managers, the organisation is a relational network (Scott, 2001) that recognises high achievers in the renewable energy subfield by awarding prizes (WREN, 2019). More recently, the REA established RECC as a quality assurance mechanism for certifying small-scale renewables. Similarly, Gemserv Ltd developed the MCS to certify microgeneration technologies used to produce electricity and heat from renewable sources and is an eligibility requirement for government financial incentives such as the RHI (Ofgem, 2019). It can therefore be plausibly argued, that industry sector actors such as the REA; Gemserv; and others, might have been influential rule makers who created some of the more impactful normative institutions which shaped the renewable energy subfield during the period.

As this section has shown, the instruments of UK climate and energy policies were introduced following the launch of international treaties such as the UNFCCC and EU directives such as the LPCD. One may therefore argue that the UN and the European Union might have been the main rule-makers (DiMaggio, 1988) who had shaped the renewable energy subfield during the period as they had obligated signatories and Member States to introduce national energy policies to drive the deployment of renewable energy. However, taking this view would discount the role of the UK Government; state departments (e.g. DECC, Ofgem, etc.) and industry sector actors (e.g. REA; Gemserv; etc.) in the process (Greenwood *et al*., 2002). This would be an unreasonable omission because these organisations had actualised institutional change nationally by institutionalising and repeatedly modifying energy policies relating to renewable energy and professionalising the subfield (Greenwood and Suddaby, 2006). The story here is one of collective rulemaking (Jolly and Raven, 2015; Wijen and Ansari, 2007), whereby the EU, the UK Government, state

departments and industry sector actors, worked collectively mostly to contribute to the institutionalisation of renewable energy (Greenwood *et al.*, 2002; Scott, 2001; Jepperson, 1991). One could however argue, that had the EU not introduced institutions such as the Large Combustion Plant Directive, the launch of national regulatory institutions such as the Non-Fossil Fuel Obligation might not have followed. It therefore seems that even with collective rulemaking (Jolly and Raven, 2015; Wijen and Ansari, 2007), there is a hierarchical structure in which subordinates are obliged to undertake institutionalisation projects which are seen as fit for the entire organisation and society at large.

Based on the review of the archival documents, this section has shown that the main actors who might have contributed to the institutionalisation of the renewable energy subfield during the period were the UN; the EU; the state and its various departments (e.g. DECC and Ofgem; etc); and industry actors such as the Renewable Energy Association; Gemserv Ltd; *inter alia*. This suggests that in emergent fields[10] such as the renewable energy subfield, it is likely that multiple actors work collectively to create and institutionalise the institutions that shape the field. Having identified the actors who created some of the more influential regulative and normative institutions during the final section of the chapter examines more closely some of the more impactful institutions they had created.

4.6 KEY REGULATIVE INSTITUTIONS IN THE RENEWABLE ENERGY SUBFIELD IN THE UK, 1986- 2016

This section examines some of the regulative institutions which either led to or contributed to, the institutionalisation of the renewable energy subfield during the period 1986-2016. These institutions manifested as national energy or renewable energy policies which served as powerful regulative institutions (Sarasini, 2013; Scott, 2003) which coerced organisational behaviour within the field of energy provision at the time (Scott, 2014). It can be seen from Table 11 that the most enduring regulative institutions (therefore likely to have been institutionalised) during the period were the Renewables Obligation (including ROCs); the Climate Change Levy; the Climate Change Act 2008; the UK Renewable Energy Directive 2009/28/EC and the Feed-in Tariffs (FITs). The thesis now scrutinises each institution from the perspective of institutional theory.

[10]Emergent field- an organisational field on the verge of becoming prominent.

The Renewables Obligation (RO) was introduced in England, Scotland and Wales in 2002 as a policy instrument to try and increase large-scale electricity generation from renewable energy sources (BEIS, 2017a). In order to achieve this, large commercial operators (e.g. Big Six energy firms) are obligated to source a proportion of their electricity from eligible renewable energy sources or pay a penalty (Ofgem, 2019a). To demonstrate that their obligations are being met, suppliers are required to produce a Renewables Obligation Certificates (ROC) for every Megawatt hour (MWh) of electricity they supply to the relevant authority, Ofgem. Should they fail to produce the predetermined amount of ROCs, suppliers are required to pay a buy-out fee, which is redistributed amongst suppliers who have produced the required amount of ROCs in a particular period (e.on, Energy, 2013). Given this, the RO is a market-based instrument that, in theory, creates incentives for innovation and facilitated cost-efficient measures to reduce carbon emissions (North, 1990). By using ROCs as a tradable commodity, the RO has created a commodity that is of financial value to large commercial providers of energy in the UK. For that reason, one of the main strategies that large energy firms use to meet their obligation is to purchase ROCs from their customers (e.on, Energy, 2013). Although ROCs are issued free of charge to generators for every MWh of renewable electricity they produce, they are sold as separate entities to the electricity itself. This has the effect of creating two markets and two revenue streams, with ROCs acting as a premium on top of the spot price of electricity. This incentivises the development of renewable energy, strengthens its legitimacy (Suchman, 1995), which probably contributed to institutionalising renewable energy during the study period (Greenwood *et al*., 2002; Scott, 2001; Jepperson, 1991).

The Climate Change Levy (CCL) is a policy mechanism introduced in April 2001 as a form of carbon tax on non-domestic energy users in the UK (House of Commons Environmental Audit Select Committee, 2008). The CCL was introduced under the Finance Act 2000 and applies to businesses in the industrial, commercial, public services and agricultural sectors (HMRC, 2019). It is charged on taxable commodities for power, heating and lighting purposes (e.on Energy, 2019) and has an inbuilt carbon price support (CPS) rate. Lower CPS rates of the levy encourages businesses to generate their own electricity using their own low-carbon technologies (HMRC, 2019). By being an environmental tax, it encourages businesses to reduce their overall greenhouse gases emissions (House of Commons Environmental Audit

Select Committee, 2008), which may have had the effect of incentivising businesses to install renewable energy systems. According to North's (1990) aggregation of institutions, the CCL is a formal institution that has emanated from a regulated process (in this case the state- see Table 10), unlike informal rules which emanate from society (*ibid*, 1990, p.40). Being a regulative institution, the CCL uses sanctions (in this case charges for non-compliance) to coerce organisational behaviour in the field of energy provision (Scott, 2001). Institutions however, consists of both formal and informal components, therefore to be truly legitimate, they must be accepted by society at large (Suchman, 1995). Since the levy is only applicable to non-domestic users in the UK however, there may be less of a requirement for it to be perceived by the general public as being legitimate (Suchman, 1995) and its appropriateness might receive far less questioning than the Feed-in Tariff, *per se*. This is not to say that its legitimacy will not be questioned, because from the point of view of the businesses it affects, it may be regarded as being illegitimate (Suchman, 1995). For example, at its launch in 2001, the CCL rates were frozen at 0.43p/kWh on electricity, 0.15p/kWh on coal and 0.15p/kWh on natural gas (House of Commons Environmental Audit Select Committee, 2008). By the end of the study period however, this had risen to 0.559p/kWh on electricity and 0.195p/kWh on natural gas (HMRC, 2016). This may have made renewable energy comparatively less legitimate than natural gas (Suchman, 1995). Nonetheless, the CCL may have contributed to the institutionalisation of renewable energy through a process of theorisation (Greenwood *et al.*, 2002), whereby low-carbon technologies, such as renewable energy, were pitched as better alternatives than polluting technologies such as coal and petcoke for providing energy to businesses. By so doing, it may have contributed to changing the dominant institutional logic (Thornton and Ocasio, 1999) that high carbon technologies were appropriate for the provision of energy in the UK, thus having a role in the deinstitutionalisation of coal.

Another policy instrument which may have contributed to shaping the renewable energy subfield during the period was the Climate Change Act 2008. One of key means by which this policy meets its objectives, is placing a duty on the Secretary of State to ensure that the net UK carbon account for all six Kyoto greenhouse gases for the year 2050 is at least 80% lower than the 1990 baseline (Climate Change Act 2008.p.1(1) (1)). The six Kyoto greenhouse gases are Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O), Hydrofluorocarbons (HFCs),

Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF6) (United Nations, 1998). The main aim of the Act is to enable the UK becoming a low carbon economy by giving ministers powers to introduce the necessary measures to achieve a range of greenhouse gas reduction targets (Climate Change Act 2008.p.1 (6) (1)). In order to ensure that the state did not exercise its agency unfairly (Dacin *et al*., 2002), an independent Committee on Climate Change was created under the Act to advise the UK Government on targets and related policies ((Climate Change Act 2008.p.2 (32) (1)). Being an Act of parliament, the Climate Change Act 2008 is a regulative institution, therefore its launch would have made actors in the field of energy provision act instrumentally and expediently (Scott, 2001). In that way, actors might have complied with the Act because it is legally sanctioned by the state and offers a legitimate solution for the problem of climate change (Suchman, 1995). On the other hand, its coerciveness (Scott, 2001) may have caused some actors in the field to act involuntarily without necessarily complying because it was the right thing to do (Walker *et al*.2014; Suchman, 1995).

The bedrock of the UK's renewable energy policies lies in EU Renewable Energy Directive 2009/28/EC. It obligates the UK to provide at least 15 per cent of its final energy consumed and 10 per cent of transport fuels from renewable energy sources by 2020 (DECC, 2009). The Directive also stipulated that all Member States should have produced a National Renewable Energy Action Plan by 30 June 2010 that describes how they intended to achieve their targets. In response, the UK published its NREAP in 2009 as a policy document that "*provides details on a set of measures that would enable the UK to meet its 2020 targe*t" (Cabinet Office, 2009). NREAP states that to deliver those objectives, the Office for Renewable Energy Deployment (ORED) was established to ramp up the deployment of renewable energy (*ibid*, 2009, p.7). More recently, to meet the goals of NREAP, national energy policies have been devolved to each UK country, with the different countries having varying degrees of autonomy for renewable energy policy formulation (Parliament UK, 2017). Due to being a time-bound, regulative institution (Scott, 2001), actors in the subfield may have been motivated to use innovation (e.g. manufacturing wind turbines with greater outputs) to escape the constraint of having a limited time to achieve a set goal (Walker *et al*., 2014) Further, one of the central planks of DiMaggio's (1988) thesis is the idea of institutional entrepreneurs changing institutional arrangements in organisational fields to achieve interests they value highly. This suggests that institutions created by

institutional entrepreneurs must attain the status of being institutionalised (Greenwood *et al*., 2002; Scott, 2001; Jepperson, 1991), in this case, accepted in a taken-for-granted way (Scott, 2001). Formulators of NREAP seemed to have recognised this, pledging to support renewable energy getting to that stage by using "financial incentive mechanisms for renewable energy and capital grant schemes" Cabinet Office, 2009, p.143). This suggests that the Renewable Energy Directive 2009/28/EC recognised the importance of financial incentives, such as the Feed in Tariffs, being used to assist renewable energy getting to stage of being able to stand on its own feet (Greenwood *et al*., 2002; Scott, 2001; Jepperson, 1991).

The final policy mechanism which may have contributed to shaping the renewable energy subfield was the Feed-in Tariffs (FITs) scheme. Launched in April 2010, the FIT accelerated investment in renewable energy (DECC, 2011b) by requiring participating licensed electricity suppliers to make payments on both the generation and export of renewable electricity and heat from eligible installations (Ofgem, 2019b). It is available for anyone who had installed solar PV; wind energy; hydropower and anaerobic digestion (AD) up to a capacity of 5MW and micro combined heat and power (CHP) up to a capacity of 2kW (*ibid*, 2019b, p.1). By setting the thresholds at 5MW (PV; wind; hydro; AD) and 2kW (CHP) respectively, small-scale generators of renewable electricity and heat (e.g. domestic consumers) have the opportunity to participate in the production of renewable energy. Its facilitation of inclusiveness is likely to have strengthened the legitimacy of the FIT (Suchman, 1995), thus its support base. Although tariff rates were set by DECC at the time of its introduction, the scheme was administered by FIT licensees, Gemserv (though the MCS scheme) and Ofgem (Ofgem, 2011). It is highly likely that this had strengthened its normative dimensions since third party certification and accreditation (Scott, 2001) by independent bodies such as Gemserv would have given consumers the confidence that vested interests were not being pursued (DiMaggio, 1988). Being an incentive scheme, the cultural-cognitive dimension of the FIT will be culturally supported (Scott, 2001) if it is regarded by consumers as being attractive enough. This might have been the case, because in the first year of its launch, there were 30,201 installations participating in the scheme, generating some 68,559.4 MWh of electricity (Ofgem, 2011). Admittedly, at the time of its launch, the FIT rate for small-scale photovoltaic installations (4MW or less) was set at 41.11p/kWh (Ofgem, 2011a), which is likely to have made it very attractive to consumers. At the end of the study

period however, this had been reduced to 4.41p/kWh (Ofgem, 2016), which may have had the effect of reducing its legitimacy (Suchman, 1995) and weakened its cultural-cognitive dimension (Scott, 2001).

4.7 SUMMARY

The aim of this chapter was to set the scene for the inquiry by examining the research setting, the UK, and some of the key features related to way it provided its energy during the study period. Having done so, the chapter has shown that the manner in which the UK provides its energy is of central concern because its relatively large, growing population and industries have an almost insatiable demand for energy, however, its renewable energy resources have not been fully exploited to assist in satisfying this demand. In order to demonstrate this, the reader was first introduced to the UK's geographical setting, where it was shown that the country has some of the best renewable energy resources in Europe, particularly wind power and marine energy potentials. The chapter progressed to exploring the UK's energy landscape, where it found that it was still dominated by fossil fuels since this technology provided 82% of the final energy consumed at the end of 2015. This suggests that at the end of the study period (2016), fossil fuel practitioners were the dominant players in the field of energy provision and the institutional logic that the UK should provide its energy from hydrocarbons prevailed.

The chapter next examined renewable energy from a technological perspective to see how it compared with its fossil fuel counterparts. Here, it found that technically most of the renewable energy technologies had advanced to the stage of either being more viable, as viable, or almost as viable as the main fossil fuel technologies. The examination shows that of all renewable technologies, bioenergy, specifically biomass, had the highest degree of legitimacy because of its high efficiency, competitiveness and suitability for producing baseload electricity. On the other hand, biomass was less legitimate than nuclear in terms of efficiency and less legitimate than onshore wind; large-scale solar PV and natural gas in terms of cost. Onshore wind was the most legitimate of all technologies in terms of cost, however, it was less legitimate than nuclear, natural gas and bioenergy in relation to efficiency. Another notable observation was that solar PV and wind power had progressively gained in legitimacy over the study period, in terms of efficiency and cost.

In the next section, the chapter investigated some of the main events in the field of energy provision to see which ones might have been the critical events that prompted institutional change. Here, it found that there were three main critical events during the study period: (1) the liberalisation of the energy market (1986- 1996); (2) a period of environmental protection (1988-2007); and (3) the launch of the UK Renewable Energy Directive 2009/28/EC (2009). These were critical events because not only did they influence the path of institutional development for the renewable energy subfield, they also overcame institutional drag to become institutionalised themselves. The section that followed identified the main rule-makers during the period. Here, it was found that the main rule makers were the UN; the EU; the state and its various departments (e.g. DECC and Ofgem; etc); and industry actors such as the Renewable Energy Association; Gemserv Ltd; *inter alia*. Thus, it was agreed that no single actor made the rules, but a collection of actors enacting divergent institutional change. In closing, the chapter examined some of the most impactful rules (institutions) which the rule-makers had created to see what role they may have played in shaping the renewable energy subfield during the study period. The chapter has shown that some of the most influential regulative institutions created during the period were the Renewables Obligation (including ROCs); the Climate Change Levy; the Climate Change Act 2008; the UK Renewable Energy Directive 2009/28/EC and the Feed-in Tariffs (FITs). These were some of the more impactful institutions because they had coerced some actors to expediently pursue renewable energy as a viable technological form. Given the significance of these observations, the next chapter presents the primary data gathered by the empirical element of the thesis to see how they correspond.

CHAPTER FIVE

FINDINGS OF THE EMPIRICAL RESEARCH

5.1 INTRODUCTION

In chapter four, the research setting and context were described based on the analysis of the archival documents. Now, this chapter presents the findings of the empirical element of the thesis. The empirical findings have been presented separately from the secondary data because whereas the primary data are based on the views of the informants interviewed for this thesis, the secondary data are historical accounts of the findings of other researchers and analysts who had examined the field of energy provision during the period. As such, there may be divergences in the data collected by the secondary research and empirical research. For the same reason, eminent research authors recommend that primary and secondary data should be presented separately because they may provide different information, or/and different perspectives. Chapter 6 which follows, however, collates both sets of data to interpret what they mean in light of the research questions, literature review and theoretical framework.

As established by the literature review, researchers had not previously analysed on the basis of empirical data if institutional entrepreneurs had played a role in shaping the renewable energy subfield in the UK. This represented a gap in knowledge because other studies have shown this to be the case in their empirical settings. The aim of this chapter is to fill that gap by presenting the findings of the empirical research. As discussed in chapter three, the data were analysed thematically with the help of the qualitative analysis software NVivo 11 to record themes within the data. These themes are important because they are the categories that emerged from the analysis. A total of eleven categories arose from the analysis. These categories relate to the research questions as follows:

RQ1. "How might have institutional entrepreneurs shaped the renewable energy subfield in the UK during the period 1986-2016 and what impact may this have had on the field of energy provision?"

Categories: (1) Institutional Changes (2) Spheres of Entrepreneurial Activities (3) Institutional Entrepreneurs (4) Properties of Institutional Entrepreneurs.

RQ2. "What conditions facilitated or hindered the shaping of the renewable energy subfield in the UK during the period 1986-2016?

Categories: (1) Enabling Conditions (2) Institutional Constraints.

RQ3. "How might have renewable energy institutional entrepreneurs gained legitimacy for themselves and their activities when trying to reshape the field of energy provision in the UK during the period 1986-2016?"

Categories: (1) Intervention Strategies Employed (2) Inertia to Change (3) Overcoming the Paradox of Embedded Agency (4) Legitimacy Building Strategies (5) Carriers of Institutions.

Figure 7 and Table 12 on pages 158 and 159 respectively, show the linkages between the categories and research questions. The chapter is structured according to how the categories relate to the research questions. After the introduction, Section 5.2 presents the categories related to research question 1. Section 5.3 provides the categories concerned with research question 2. Section 5.4 covers the categories associated with research question 3. Section 5.5 summarises the findings.

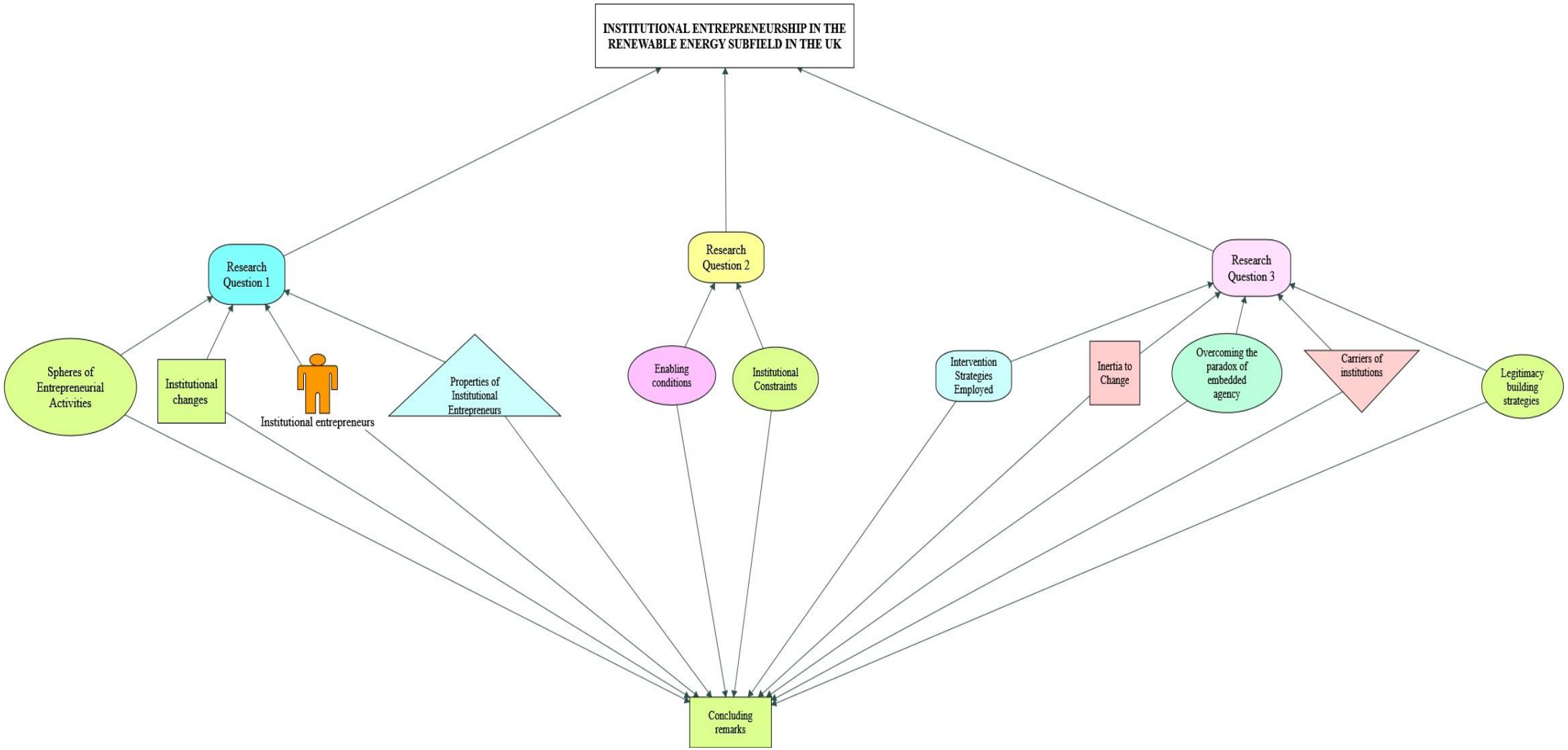

Figure 7: Concept Map of the Findings of the Empirical Element of the Research

TABLE 12: THE LINKAGES BETWEEN THE RESEARCH QUESTIONS, CATEGORIES AND INFORMANTS' AGREEMENT

RESEARCH QUESTION	CATEGORIES	AGREEMENT ACROSS INFORMANTS
RQ1: "How might have institutional entrepreneurs shaped the renewable energy subfield in the UK during the period 1986-2016 and what impact may this have had on the field of energy provision?"	1. Institutional Changes	Institutional entrepreneurs had shaped the renewable energy subfield in the UK during the period 1986-2016 by enacting institutional change. The renewable energy subfield had however only undergone partial institutionalisation.
	2. Spheres of entrepreneurial activities.	The renewable energy subfield in the UK and its overarching field of energy provision are not geographically bounded spheres, but areas of common interests that institutional entrepreneurs had shaped by defining their structures.
	3. Institutional Entrepreneurs	Five broad categories of actors practised as institutional entrepreneurs: (1) renewable energy practitioners/activists; (2) incumbent energy practitioners; (3) the state and its various departments such as DECC, Ofgem and the Environment Agency, (4) the European Union, and (5) the United Nation.
	4. Properties of Institutional Entrepreneurs.	The four main properties of the institutional entrepreneurs were: (1) perseverant (incorporating resilient); (2) the ability to mobilise others; (3) persuasive; and (4) good management skills.
RQ2. "What conditions facilitated or hindered the shaping of the renewable energy subfield in the UK during the period 1986-2016?	1. Enabling Conditions	The three enabling conditions are: (1) field-level conditions; (2) actors' social positions and (3) institutionalised structural myths.
	2. Institutional Constraints	The six main institutional constraints were: (1) poor energy infrastructure; (2) the poor credibility of the renewable energy subfield; (3) financial constraints; (4) sociological constraints such as the UK being an oil-based economy; (5) prevailing assumptions, myths and beliefs about renewable energy; and (6) environmental degradation.

RQ3. "How might have renewable energy institutional entrepreneurs gained legitimacy for themselves and their activities when trying to reshape the field of energy provision in the UK during the period 1986-2016?"	1. Intervention Strategies Employed.	The main intervention strategies used by the institutional entrepreneurs to initiate institutional change were creating; lobbying; mainstreaming; framing; educating and collaborating.
	2. Inertia to Change	The main antagonists to institutional change were state regulatory bodies; incumbent energy practitioners and District Network Operators [DNOs].
	3. Overcoming the Paradox of Embedded Agency	Renewable energy practitioners proving that renewable energy is a viable technological solution. • Innovation • Social skills • Personal resources .e.g. financial capital
	4. Carriers of Institutions	The carriers of institutions were identified as symbolic systems; relational systems; routines and artefacts
	5. Legitimacy Building Strategies	The five legitimacy building strategies are: (: (1) theorising; (2) proving the viability of renewable energy; (3) renewable energy practitioners being honest and honourable; (4) being regulated; and (5) creating jobs Conversely, the three delegitimising factors are: (1) the unethical behaviour of renewable energy practitioners; (2) prevailing misconceptions and beliefs about renewable energy; and (3) subsidy cuts (incorporating job losses)

5.2 SHAPING THE RENEWABLE ENERGY SUBFIELD IN THE UK, 1986-2016.

As highlighted in section 5.1, the four categories which emerged from the data gathered to answer research question one are (1) Institutional Changes; (2) Spheres of Entrepreneurial Activities; (3) Institutional Entrepreneurs; and (4) Properties of Institutional Entrepreneurs. The "institutional changes" category sums up respondents' recurrent views on the manner in which the field and subfield had evolved and also provides evidence of institutional entrepreneurship, while the "spheres of entrepreneurial activities" category presents the common themes related to the area which the institutional entrepreneurs had shaped during the period. The "institutional entrepreneurs" category groups the informants' recurrent views on the change agents. The "properties of institutional entrepreneurs" category espouses respondents' perception of the special characteristics, abilities and qualities of the agents who enacted the institutional changes. These categories attest to whether or not institutional entrepreneurs had played a role in shaping the renewable energy subfield and field of energy provision in the UK during the period 1986-2016.

5.2.1 Institutional Changes

This subsection presents the findings related to the institutional changes category. The empirical data suggest that during the period 1986-2016, the renewable energy subfield had been primarily shaped by institutional entrepreneurs enacting institutional changes. In the manner discussed by informants, institutional change refers to an enduring and pervasive change in the formal and informal rule systems within the field. Two types of institutional changes seem to have occurred (1) institutional development of the renewable energy subfield, and (2) institutional formation in the case of the field of energy provision. The data, however, suggest that although the renewable energy subfield had undergone a process of institutionalisation, this was only partial. The type and manner of the main institutional changes that occurred are elaborated upon as follows.

Informants had mixed views on the extent of institutional change of the field of energy provision. In contrast, many readily agreed that it was a mature field, with some tracking its advent beyond the inception of the steam and electricity eras. Respondents who believed that the field of energy provision had changed considerably explained that it has evolved from providing almost all of its energy from hydrocarbon and sources to a more mixed composition, comprised of conventional hydrocarbon and

nuclear fuels, renewable energy and other emerging technologies. Interviewees typically portrayed the field of energy provision as being in a state protracted flux, with some technologies being favoured during certain periods. For example, coal being the dominant technology before the period of environmental concerns and gas being favoured during the "dash for gas" era, Nevertheless, the consensus was that the field of energy provision had not changed radically from sourcing its energy from hydrocarbon and nuclear technologies, as this UK Country Manager remarked:

> *"Has it evolved? Well, it's evolving. I don't think it has evolved a lot actually. I think we are starting to see the energy system evolve and I think it's not so much down to large scale renewables, it's down to distributed renewables and demand-side response."* (UK Country Manager- Multinational Energy Conglomerate).

In stark contrast, most respondents believed that the renewable energy subfield had undergone considerable institutional changes during the period. Typically, interviewees felt that the renewable energy subfield had evolved from being a relatively new community, populated by a few "geeky", pure-play[11] renewable energy players, to a highly professionalised field responsible for deploying at relatively large-scale. This excerpt encapsulates a typical view:

> *"It's come from a very small industry full of enthusiasts, which was where it was twenty years ago, sort of 'geeky' engineers to an industry driven by finance. It's moved into the mainstream and it's become an investment asset class; it has become professionalised in scale..."* (CEO- Specialist RE Investment Vehicle).

Most respondents believed that the main catalyst for the growth of the subfield was the UK's obligation to provide at least fifteen per cent (15%) of its final energy consumed from renewable energy sources by 2020. Generally, respondents felt that the renewable energy subfield in the UK was still evolving and was an incomplete organisational field, characterised by being an unorganised, malleable[12] sphere which lacked structure and direction.

[11] Pure-play: An individual or organisation that focuses on particular product or service in order to obtain a share of the market.

[12] Characterised by having an unformed structure, undefined boundaries and uncommitted actors and organisations.

One commonly held view was that the evolution of the renewable energy subfield had been constrained by two waves of feed-in tariff cuts (2011 and 2016). Here, the underlying belief was that these cuts had undermined its growth because subsidies were necessary to sustain renewable energy until it had reached grid parity, as this leading CEO explained:

> *"The whole point about these support mechanisms is to drive the market towards grid parity. Drive the market to the point where you don't need subsidies because you are standing on your own two feet, competing with other forms of electricity generation. The Government doesn't always get it right first time, therefore what they tend to do if there is deployment greater than they have expected, it tends to cut those tariffs because it doesn't want to overspend its budget."* [Founder/CEO, Major UK Solar PV Developer].

In this regard, respondents agreed that the renewable energy subfield needed state support until it had progressed to the stage of being able to stand on its own feet.

Respondents' views suggest that the institutional entrepreneurs had primarily shaped the renewable energy subfield by creating three types of institutions: (1) regulative institutions; (2) normative institutions, and (3) cultural-cognitive institutions. Table 13 presents these. As the table shows, the majority of formal institutions were written, easily recognised rules such as regulatory instruments-legislation governing renewable energy; renewable energy policies; national climate targets; renewable energy incentives schemes and so forth. The informal institutions on the other hand, were the less obvious, unwritten rules, for instance, the norms, myths and customs that shaped behaviour in the field.

The data indicate that different actors had played a facilitative role in institutionalising specific categories of institutions. The majority of regulative institutions for example, were created by state departments, whereas the normative institutions were primarily formulated by renewable energy practitioners. A significant proportion of the informal institutions were prevailing assumptions, myths and beliefs about renewable energy being upheld by civil society. The informants also identified a number of regulative and normative institutions created by the EU, National Grid and DNOs.

Significantly, respondents asserted that the incumbent energy practitioners dictated how the UK provides its energy by maintaining a central electricity generation system. In a similar way, many informants expressed the view that DECC played a

facilitative role in defining how things were done in the renewable energy subfield. This is significant because it suggests that these two agents were responsible for creating the institutional logics for energy provision in the UK. In other words, the convention that hydrocarbons, nuclear and by exception offshore wind power, should be the technologies of choice for the UK's future energy provision. To underpin this view, informants were insistent that the incumbents were reluctant to switch to decentralised power generation because this threatened their business model and that this was being supported by the state which had prioritised these conventional technologies for the provision of energy in the UK.

Surprisingly, interviewees generally believed that the pure-play renewable energy players were not those responsible for the major technological innovations within the subfield. Many respondents explained that this was because the majority of these companies did not possess the necessary resources to do so, nor, had received the requisite state support to facilitate this. Some informants however felt that technological innovations such as offshore wind and biomass had provided a justifiable basis for receiving additional state support because they had enabled some renewable energy technologies to compete on the basis of cost with conventional fossil fuel technologies. This view is supported by the data which show that these types of renewable energy technologies were generally favoured when the Contracts for Difference were being awarded.

Table 13: Institutions Created and Maintained within the Renewable Energy Subfield between 1986 and 2016 based on Interviewees' Responses.

RESPONSIBLE AGENT	**INSTITUTIONS**		
	Regulative	***Normative***	***Cultural/cognitive***
State departments:			
DECC	**Legislation-** e.g. Energy Acts 2013; etc. **Renewable energy policies-** RE deployment targets, etc. **National climate targets-** UK Climate Change Act, etc. **Incentive schemes-** feed-in tariff, etc. **Levies-** Carbon Tax, etc. (See institutions identified in section 5.2.2).	Accreditation of RE practitioners-MCS; RECC, etc. New membership rules for the field. New grant schemes-RHI; etc. RE public awareness programmes. Set conventions of the field. Mandating the decommissioning of coal.	The perception that RE is desirable. Inefficient organisation.
Ofgem	**Legislation and Regulations-** Renewable Energy Directive 2009; Electricity Act; Gas Act, etc.	Protection of consumers' interests.	Applying outdated staffing rules to DNOs, resulting in RE application backlogs;

		Obligation of RE practitioners to behave ethically.	Inefficient with RE applications.
Environment Agency	Environmental consents.	Prevention of environmental degradation by RE ventures.	Irrationally blocking RE projects, especially hydropower schemes in Scotland.
Local Government	Planning regulations.	Prevention of landscape defacement by RE ventures.	Unnecessarily bureaucratic. Inefficient with planning applications.
European Union (EU)	Legislation, regulations and policies affecting RE.	EU standards and accreditation.	EU a primary driver of RE diffusion in the UK.
Renewable energy practitioners	----------	**New business models**- Special Purpose Vehicles (SPVs); Independent Connection Providers; Power Purchase Agreement (PPA); turnkey projects; Energy Services Companies (ESCo) and community energy groups.	The perception that RE is desirable. Feeling incapable of changing the rules. RE sub-community has poor credibility.

New methods of energy provision- solar PV, wind power, biomass, geothermal, hydro and biofuels, etc.

New funding mechanisms- Green Electricity Tariff; ethical/green finance; Enterprise Investment Schemes; Green Bonds, Green ISA; crowdfunding; etc.

Creating membership rules for subsectors- STA membership rules; etc.

New forms of contracts- Engineering Procurement Construction (EPCs).

New RE professions- PV installers; etc.

		New vetting procedures- due diligence; etc. **Relational networks (formal and informal)** - RenewablesUK; STA; social networks; conferences; forums; blogs; etc.	
Incumbent energy providers	----------	Significant technological innovations- larger wind turbines; biomass replacing coal; etc. Conventions of the field. Incorporation of renewable energy into centralised power generation system.	Hydrocarbons and centralised power generation are more reliable and efficient technologies. RE over-subsidised-paid for by taxes on utility bills. RE is intermittent variable and cannot be stored. RE cannot meet baseload demand.
National Grid		Technical standards and specifications. Key partner in the design of the "new energy system".	Grid infrastructure out-dated and unsuitable for RE deployment.

DNOs	Grid connection regulations.	Providers of connection services to all applicants; Grid connection rules.	Unreliable with vested interests.
Civil Society (includes end-users)			NIMBYS. RE systems unsightly. RE practitioners unethical. RE is expensive. RE systems heavily subsidised. RE only produced when sunny and windy. Domestic PV schemes require south-facing roofs. UK has vast RE resources. RE is clean, low-carbon technology. Nuclear is risky. Hydrocarbons are unsustainable.

Respondents' views suggest that some institutions were more enduring and pervasive than others. In this regard, the responses indicate that cognitive institutions maintained by civil society were more widespread across society, whereas those such as the shortcomings of DECC and technological deficiencies (e.g. baseload demand; intermittency and variability; grid mismatch) were generally upheld by technocrats. Interviewees also consistently expressed their concerns about the constant changes to incentive schemes. Typically, views were presented in terms of cuts in the feed-in tariff, with informants explaining that this had been reduced from forty-three pence per kilowatt-hour at the time of its introduction in 2010, to just over four pence per kilowatt-hour in January 2016. This suggests that this was not an enduring institution. Nevertheless, some interviewees admitted that in its most recent form, the feed-in tariff type of incentive was unsustainable and that it was only a temporary, catalytic measure to support renewable energy getting to the stage of being self-supportive. Similarly, the responses indicate that DECC itself had not endured as an institution, with some informants pointing out that it was abolished in July 2016. In contrast, the data suggest that offshore wind energy was the most enduring renewable energy institutionalisation project because it had the support of the state and had proven its viability. In the same way, interviewees felt that conventional hydrocarbon technologies and the prevailing energy system were enduring and pervasive because they had been propped up by the state and the "old boys' network". Across the range of interviews, there was the commonly held view that some renewable energy practitioners were giving the renewable energy subfield a bad name through their rogue practices. This suggests that some of the cultural-cognitive institutions within the renewable energy subfield had being eroded, subsequently there was a mismatch between the different types of institutions. In spite of this, some respondents told good news stories about successful renewable energy projects.

One memorable good new story was that told by an informant about biomass having successfully displaced coal at one of the UK's largest power plant. He explained that biomass has been particularly effective in partially revolutionising the energy system because of the sheer scale of the scheme and its role in driving coal into obsolescence:

> *"That ranges from what we are doing at the power station, getting coal off and sustainable biomass on, and that can be a local story, it's a good job story. As you said, you know Eggborough* [power station] *well, they are still a hundred*

> *per cent coal-fired. At some stage they will have to shut completely because the government says 2025."* (Representative for Major Electricity Generator/Former DECC Employee).

. Another good news story was that of an informant who had grown to become one of the largest PV developers in the UK. Not only did he enjoy considerable success, he was also responsible for pioneering works such as the development of the UK's first and Europe's largest floating solar farm. While reflecting, another respondent explained that he had entered the subfield at the same time as this actor, with roughly the same amount of resources. However, while he had adopted a SPV business model, the major PV developer had employed a PPA, and whereas he first acquired the projects then the financial capital, his counterpart took the opposite approach. The major developer progressed to being the first PV developer in the UK to reach a total installed capacity of one gigawatt, or put differently, the owner of one in every six solar panels in the country. This claim was later validated by the informant referenced, who boasted:

> *"So unlike everyone else, we went and got the money, so regardless of what happened we were funded and we were able to then mop up the market when the rules changed or the tariffs fell. Everyone else failed to do that, which is why everyone else is either slightly slower or slightly smaller today."* (CEO-Major PV Developer).

This suggests that the business models utilised by practitioners played key roles in the success of renewable energy ventures.

One interviewee recalled how he had persuaded the Financial Conduct Authority (FCA) to authorise and regulate the UK's first community finance platform/ crowd-funding platform, a specialist investment vehicle for renewable energy projects. While describing another investment vehicle he had recently launched for renewable energy projects, he said:

> *"It is an extension on the conventional ISA to crowdfunding, which means that you can come unto our platform, put your money into an ISA or transfer money from an another ISA and buy our investments in renewable energy projects, but from within your ISA. The benefits are twofold, they get access to a new type of investment and the benefit to our borrowers."* (Founder/CEO-Specialist RE Finance Company).

Yet another informant remembered how he has almost single-handedly kick-started the onshore wind sector in Northern Ireland by being the first bespoke company to develop wind farms in that country. These are but a few of the stories told about pioneering works during the interviews, which suggests that a number of innovative solutions had contributed to shaping the renewable energy subfield during the period.

In summing up, this subsection has presented the informants' views on whether the renewable energy subfield and its overarching field of energy provision in the UK had been shaped during the period 1986-2016. Informants' responses suggest that both fields had been shaped during the period, however, whereas the field of energy provision has gone a process of institutional development, the renewable energy subfield had undergone a process of institutional formation, albeit, only partial institutionalisation. The subsection has also shown that the renewable energy subfield had primarily been shaped by actors creating and institutionalising several regulative, normative and cultural-cognitive institutions, however, there was a mismatch between the different categories of institutions. Generally, informants felt that the incumbent energy providers and state departments such as DECC had defined the institutional logic that the UK should provide its energy using hydrocarbons, nuclear, and by exception, offshore wind power. Having presented the informants' views on whether or not the renewable energy subfield had been shaped during the period in this subsection, the next subsection provides their perceptions of the organisational fields that had been shaped or reshaped.

5.2.2 Spheres[13] of Entrepreneurial Activities

This subsection presents informants' views on the organisational spheres in which the institutional changes had taken place during the study period. In the manner discussed by informants, these organisational spheres are areas commonly referred to by institutional analysts as organisational fields. The data suggest that these spheres bear the characteristics of being unbounded areas, unified by common issues and occupied by a diverse range of actors involved in multiple interconnected and unrelated activities.

There was a wide variation in the informants' perceptions of what constituted the renewable energy subfield. In most cases, respondents identified different sets of

[13] Organisational sphere: An area of activity, interest expertise or aspect of life unified by a particular activity. Otherwise referred to by institutional analysts as an organisational field.

cohorts as being field constituents, with the composition generally being dependent on the activities in which the various segments engaged; and/or the relationships which the informants had with other parties surrounding a common issue. That is, the perception of the renewable energy subfield was usually based on constituents' relationships with other actors and organisations, with field cohorts in most cases interacting fatefully with each other. For example, renewable energy practitioners operating in Scotland regarded the Scottish Environment Protection Agency (SEPA) as a constituent which had a deciding role on their fates, as this typical excerpt illustrates:

> *"So, because they are on the rare list, you have great difficulty building hydro schemes there because the environmental agencies, the SEPA [Scottish Environmental Protection Agency] being the main one, has very strong lobby on what happens in the environment and in my opinion, it is far too strong and far too badly informed about economic progress in general, and social progress.* (Founder/Manager- Micro-hydro consultancy).

On the other hand, respondents involved in the provision of financial services for renewable energy ventures regarded the Financial Services Authority (FSA) as a key member of their subfield:

> *"We have always talked about people investing in things and the FSA [Financial Services Authority] looked at it, liked the idea initially of allowing the public to invest directly in wind or solar farms. They said no to our authorisation three [3] times. Their main reason for saying no was that they were thinking that it was too complex a proposition for people to understand the risk of investing in wind or solar farms."* (CEO- Specialist RE Investment Vehicle)

This commonality in belief extended across most interviews.

The findings also suggest that there was a direct relationship between the interconnectedness of field constituents and their degree of agency, as this respondent's remark illustrates:

> *"It makes it easier because we are in direct contact with Government officials in Scotland, who are generally in the interests of renewable energy and keen to develop renewable energy, so, I'm on first-name terms with the Minister of Energy. He has helped us several times in pushing projects through, so from*

that point of view, you cannot communicate with Westminster Government in the same way." (Founder/Manager- Micro-hydro consultancy).

Typically, respondents felt that the boundaries and expanse of the subfield were linked to the development of each respective technology. In this regard, the expanse of the subfield for the more advanced technologies such as solar and wind was broad with less connectedness between constituents. Conversely, the subfield was comparatively narrower for less developed technologies such as wave energy because these were less densely populated segments. This lattermost configuration created environments conducive to higher degrees of connectedness, consequently agency. In other words, constituents belonging to the less populated segments, and devolved countries, prioritised the deployment of renewable energy and interacted more fatefully with each other. This suggests that the renewable energy subfield in the UK had its own hierarchical structure in terms of institutional agency, with actors occupying subject positions which dictated whether or not they were able to act freely and independently.

There was also evidence of some renewable energy practitioners having spanned organisational boundaries to capitalise on entrepreneurial opportunities in other fields, as this informant shared:

"So, we were a fusion between the waste industry which didn't care any at all about energy, let alone renewable energy and the renewable energy world which didn't care much about the waste industry. The renewable energy world is project finance with [the] banks involved needing long-term contracts for satisfying the conditions of the banks, credit committees for instance, whereas the waste industry had thousands of pound notes in their hip pockets and went on a day by day basis, even hour by hour basis. Those were the two drastically different worlds that we needed to bring together and we successfully did that in the end" (Founder/MD- Wind energy/biomass/Waste-to-Energy developer).

Relatedly, renewable energy practitioners geographically based in the UK also spanned geographical boundaries to interact with partners in other countries on common issues. This border spanning activity was a hot topic for many respondents as they felt this was necessary because of a lack of renewable energy products being manufactured in the UK. This necessity however extended beyond business relationships as informants felt that due to the nature of the activities in which renewable energy practitioners engaged, it was inevitable that the subfield was not geographically confined to the UK. Informants agreed that the renewable energy

subfield and the field of energy provision were not geographically bounded spheres, but rather areas of common interests that institutional entrepreneurs had shaped by defining their structures.

In summary, this subsection has presented the interviewees' opinions of the institutional spheres in which entrepreneurial activities had occurred during the study period. It has identified these spheres as being the renewable energy subfield and the field of energy provision in which it is embedded. These spheres are otherwise referred to by institutional analysts as organisational fields. The consensus was that these institutional spheres were not geographically bounded arenas, but rather areas of common interests that institutional entrepreneurs had shaped by defining their structures. Having identified and defined the organisational spheres in this subsection, the next subsection identifies those who had a major role in shaping them during the study period.

5.2.3 Institutional entrepreneurs

This subsection provides respondents' views on those who had practised as institutional entrepreneurs during the study period. The empirical data suggest that five broad categories of actors practised as institutional entrepreneurs during the period 1986-2016: (1) renewable energy practitioners/activists; (2) incumbent energy practitioners; (3) the state and its various departments such as DECC, Ofgem and the Environment Agency (4) the European Union, and (5) the United Nations. Table 14 further on in this chapter lists the informants who met the criteria for being classified as institutional entrepreneurs.

One common view across the responses was that DECC played the most significant role in shaping the renewable energy subfield by establishing its legitimacy, as this typical view illustrates:

> *"Well, I suppose DECC, the Department for Energy and Climate Change, is the ultimate body that decides the shape of the industry at the moment. They are the ones that develop the market mechanisms."* (CEO- Medium-sized Wind Energy Developer)

Respondents felt that DECC had the ultimate duty of defining the structure of the subfield because it had been tasked with this responsibility by the UK Government. Interviewees explained that DECC had attempted to change the institutional logic that UK should provide its energy from fossil fuels and nuclear by incentivising the market to provide more of the UK's energy from renewable energy sources by introducing the

Non-Fossil Fuel Obligation (1990); feed-in tariff (2010); carbon tax[14] (2010) and the Renewable Heat Incentive (2011). There was also reference to DECC introducing the Electricity Market Reform (2013) as a policy mechanism to respond to the energy trilemma[15] facing the UK, with the Contracts for Difference; Capacity Market and the Domestic Renewable Heat Incentive (2014) being integral parts of this.

Interviewees also mentioned that DECC and Ofgem were responsible for creating the convention and identities of the field of energy provision. Typically, this was framed in terms of these two state departments setting the rules because the Government had discharged this duty by fiat, as this respondent explained:

> *"I mean, obviously you've got DECC, the main ones who have the political clout. They set the framework. Ofgem administers everything and interpret the rules and we all have to follow them."* (CEO- Small-sized Solar Installer).

Generally, interviewees felt that the rules created by these departments were effective, however, some respondents criticised Ofgem for utilising outdated rules such as setting the staff levels for some organisations (for example the National Grid), which in this case had the negative effect of causing backlogs. Respondents also criticised DECC for not having a more stringent vetting system for determining the suitability of entrants to the renewable energy subfield. Others blamed DECC for "decimating" the renewable energy subfield by "drastically" cutting incentives. Some informants attributed this to the poor modelling of the subsidies. It was also widely felt that in recent years DECC had switched its agenda from encouraging the diffusion of renewable energy to promoting nuclear, natural gas, and offshore wind, because of vested interests:

> *"There are very clear guidelines, which now interestingly, DECC officials will say they have a priority. Their mandate is to deliver nuclear; fracking; and international relations on energy infrastructure."* (Founder/CEO- Community Energy Group).

Interviewees agreed that although DECC portrayed the field of energy provision in the UK as a free market, this was not the case, as this typical quote illustrates:

[14] A tax levied on the carbon content of fuels.
[15] Decarbonising electricity supply; security of supply; minimising cost to consumers

> *"The government is trying to hide behind a free market to say that it is not them controlling the system, but they are."* (CEO, Leading Onshore Wind Developer).

Some interviewees criticised DECC for having not worked collaboratively with renewable energy practitioners, and when it did, recommendations were not taken into account. Some informants however provided objective proof which contradicted this, with one CEO mentioning that the ELEXON[16] rule was undergoing change, a feat accomplished while he sat on the Board on behalf of community energy groups. The consensus was that DECC had changed from being a pro-renewables organisation at the time of its inception to an anti-renewables establishment at the time of its abolition (2016).

Across most interviews, respondents felt that incumbent energy firms had played a major role in shaping the renewable energy subfield. For clarification, interviewees identified the incumbents as practitioners with fossil fuel assets, but in most cases referred to the Big Six energy providers: British Gas; EDF Energy; E.ON UK; npower; ScottishPower and SSE. The underlying belief was that due to being the developers and/or owners of some of the larger-scale renewable energy assets, incumbent energy practitioners had contributed significantly to shaping the renewable energy subfield. Here is how one interviewee contextualised his firm's role in this:

> "*London Array is the biggest offshore wind farm in the world. It's been running now for four* [4] *years. Good performance; high availability; good output, so I think London Array is a good flagship for the industry, but we've moved on a long way since then."* (UK Country Manager- Multinational Energy Conglomerate).

There were mixed views on the impact of incumbent energy practitioners on the renewable energy subfield, with many respondents meeting their motives with suspicion. In this regard, the underlying belief was that some incumbent energy practitioners entered into the field purely to meet regulatory or statutory obligations, rather than to drive the diffusion of renewable energy. While some respondents were sceptical, the main belief was that incumbent energy practitioners had entered the

[16] Administrators of the Balancing and Settlement Code (BSC), which compares how much electricity generators and suppliers say they would produce or consume with actual volumes.

renewable energy subfield because it had many opportunities they could capitalise upon.

A common view across the responses was that pure-play renewable energy practitioners had been major change agents in the renewable energy subfield. Referred to in this way, respondents meant renewable energy practitioners who focussed mainly on renewable energy ventures. Of the pool of informants, six respondents or their work organisations connected to the renewable energy subfield qualified as institutional entrepreneurs (see Table 14 on page 178). Although three other actors were awarded similarly high scores, they did not meet the criteria because the institutional changes they had enacted had not displayed the characteristics of being institutionalised. The respondents' views indicate that these actors engaged in a range of activities, including but not limited to, the development and operation of renewable energy ventures. For example, solar farms; wind farms; biomass power stations; hydropower schemes; geothermal schemes; wave and tidal schemes; biofuel and ocean ventures, among others. Some of the more commonly discussed pure-play practitioners across the interviews were Lightsource; Good Energy; Ecotricity; Solarcentury; Bluefields; Lark Energy and the Mark Group. The most spoken about pure-play company was Lightsource because it had deployed an installed capacity of one gigawatt (1GW) of solar PV at the time of the interviews.

Across the range of interviews, a distinction was made between two main types of renewable energy practitioners: first-movers (pre-incentives) driven by environmental and sustainability ideals and late entrants (post-incentives) driven by opportunism. Many of these first movers started out as small cottage industries who went on to enjoy different levels of success, as this informant recalled:

> *"I mean when I started looking into [getting] solar panels for this house in the mid-nineties, there were a couple of guys who had a few small companies in their gardens, garages. They would sell small wind turbines, a few small panels with a battery system, THOSE GUYS started it off."* (Domestic Consumer/Eco-warrior).

TABLE 14: Institutional Entrepreneurs Identified by the Analysis of the Empirical Data

Interviewee	Introduced alternative mode of operating?	Stand out from others in the field?	Objective proof of reshaping field?	Cited as exemplar by other interviewees?	Owner/developer of major RE venture?	Direct role in shaping RE policy?	Pioneer or innovator in RE?	Major RE player?	Significant role in driving RE diffusion?	Significant role in stymieing RE diffusion?	Possess exceptional qualities/ characteristics?	Total number of activities and roles
1	No	No	No	No	No	No	No	No	No	No	No	0
2	No	No	No	No	No	No	No	No	No	No	No	0
3	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	8
4	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	Yes	6
5	No	No	No	No	No	No	No	No	No	No	No	0
6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	10
7	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	No	No	6
8	Yes	No	No	No	No	No	Yes	No	No	No	No	2
9	No	No	No	No	No	No	No	No	No	No	No	0
10	No	No	No	No	No	No	No	No	No	No	Yes	1
11	Yes	No	No	No	No	Yes	Yes	No	No	No	No	3
12	No	No	No	No	No	No	No	No	No	No	No	0
13	No	No	No	No	No	Yes	No	No	No	No	No	1
14	No	No	No	No	No	No	No	No	No	No	No	0
15	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	9
16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	10
17	No	No	No	No	No	No	No	No	No	No	No	0
18	No	No	No	No	No	No	No	No	No	No	No	0
19	No	No	No	No	No	No	No	No	No	No	No	0
20	No	No	No	No	No	No	No	No	No	No	No	0
21	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	10
22	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	No	Yes	7
23	No	No	No	No	No	No	No	No	No	No	No	0
24	No	No	No	No	No	No	No	No	No	No	No	0
25	No	No	No	No	No	No	No	No	No	No	No	0

26	No	No	No	No	No	No	No	No	No	No	No	0
27	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	10
28	Yes	Yes	Yes	No	No	Yes	No	No	No	No	Yes	5
29	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	yes	7
30	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	10
31	Yes	No	Yes	No	No	No	Yes	No	No	No	No	3
32	Yes	No	Yes	No	No	No	Yes	No	No	No	No	3
33	No	No	No	No	No	No	Yes	No	No	No	No	1
34	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	10
35	No	No	No	No	No	No	No	No	No	No	No	0
36	No	No	No	No	No	No	No	No	No	No	No	0
37	No	No	No	No	No	No	No	No	No	No	No	0
38	No	No	No	No	No	No	No	No	No	No	No	0
39	Yes	No	No	No	No	No	No	No	No	No	No	1

During the formative years, pure-play renewable energy companies mainly focused on small-scale renewable projects (e.g. roof-mounted solar PV and flat-plate collectors), however, as the subfield grew, there were spin-offs to other renewable energy practices, professions and types of developments. Informants told stories about individual renewable energy practitioners (e.g. Good Energy; Lightsource; Ecotricity) who were instrumental in shaping the renewable energy subfield through large-scale deployments. Another strategy commonly spoken about was how some renewable energy practitioners had rented low-productive farmland to install industrial-scale renewable energy. Informants also eagerly disclosed that some renewable energy practitioners had used the strategy of installing solar PV systems on domestic consumers' roofs for free in exchange for their feed-in tariffs, as this interviewee shared:

> "*No, because we haven't paid for it. What we have done is rented out the space. It's not the roof. It's the space above the roof*". (Domestic Consumer).

Renewable energy practitioners also had a role in structuring the renewable energy subfield. Typically, this opinion was voiced in terms of renewable energy practitioners professionalising the renewable energy subfield, as this CEO's mentioned:

> "*We act purely within the renewable energy sector, primarily within solar and energy storage…… So for companies, manufacturers of inverters; modules; energy storage systems; when they are opening new territories or looking to recruit more senior staff, more experienced staff, they come to us because we know the industry very well and then we would go to market to try and find the right person, with the relevant experience for them*." (Founder/MD Specialist renewable energy recruitment firm).

Generally, respondents felt that renewable energy practitioners had impacted the field of energy provision positively by providing cleaner energy, however, the consensus was that collectively they had not reshaped the field significantly, as they had conformed, rather than changed the rules. Informants therefore appealed for a more idyllic diffusion of renewable energy, framing their arguments in terms of the UK better utilising its renewable energy resources. Some respondents cited the case of Germany as s model to replicate but conceded that due to the inherent weaknesses of renewable energy as a technological form, the UK needed a mix. Nevertheless,

informants agreed that renewable energy should account for the largest share of that mix.

The data also show that the capacity of the institutional entrepreneurs to enact institutional change was tightly connected to power. The most commonly expressed view was that the state exercised its power through its various departments (e.g. DECC; Ofgem; the Environment Agency) to decide the direction of the field. Respondents typically believed that state departments such as DECC and Ofgem exercised their power because of vested interests and only engaged renewable energy practitioners in decision making as a formality. While complaining about DECC, this interviewee criticised:

> *"They might let on to the Solar Trade Association that something is being planned, but they don't invite them to collaboratively help them decide what it should be. When they put out a consultation it is pretty much a bit of a sham because they do not listen to the consultation and then they announce what they are going to do."* (Founder/CEO- Small-scale PV Installer).

Some informants elaborated upon this, criticising some state departments for exercising their power irrationally. To support this claim, informants cited cases of state departments blocking hydropower schemes in Scotland without having justifiable reasons. Many respondents felt that this was a particularly potent constraint because the absence of a "strong green political movement" meant that the collective voice against the exercise of state power was weak.

There was considerable discussion about incumbent energy practitioners exercising power in the field by lobbying. After identifying these as the Big Six, some interviewees substantiated their claims. Speaking about the influence of incumbent energy practitioners over the Government, this informant complained:

> "*Well, principally the power and influence they have over government. They can afford to lobby as much as they want, we can't and they are much better at it than we are and I've been told that by an MP [Member of Parliament]."* (Founder/MD- Small-scale Biomass Supplier).

Many interviewees believed that the incumbents used power to maintain their positions because renewable energy practitioners had put their business model under threat. Respondents explained that to maintain their advantageous position, the incumbents collaborated with regulatory bodies to maintain the "rules of the game". The consensus was that because the renewable energy subfield is a relatively immature sphere

residing within the more mature field of energy provision, the incumbents were better placed to exercise their power of incumbency as they were the dominant players. Having said that, there was evidence of renewable energy practitioners having exercised power themselves.

It was felt that renewable energy practitioners exercised their power over four principal groups of actors and/or organisations: project partners such as investors; state departments such as DECC; local authorities; local communities and incumbent energy practitioners. Typically, the underlying belief was that because renewable energy ventures sometimes met objection, it was necessary to incentivise others to buy into renewable energy ventures:

> *"There are two parties that any practitioner needs to get on board, one is, they need to get investors and the second one is they need to get the local community. In terms of getting the community on board, there are tried and tested models that can be used. We help them by supplying the model to them. We will go to the practitioner and say "You need to get the community on board..."* (Assistant MD- RE Consultancy/MCS Certifier).

Respondents generally associated the capacity of renewable energy practitioners to influence others with their size. Typically, the underlying belief was that because the larger players possessed considerable financial capital, they were better placed to exercise power. To overcome this constraint, renewable energy practitioners sometimes joined trade associations to strengthen their collective voice or bandied together. The agreement across responses was that renewable energy practitioners were unfairly disadvantaged because they were comparatively smaller, newer entrants to the field of energy provision. Generally, there was a sense of frustration among the respondents that renewable energy practitioners were powerless to enact institutional change because of their position in the field of energy provision.

Some informants mentioned how grass-root activists had played a role in shaping the renewable energy subfield, as this respondent's view illustrates:

> *"I was used by Greenpeace, I worked for Greenpeace, so every meeting at the House of Commons they would drag me up and use as [an example of] a victim, because it costs me about two and half thousand pounds in tax to put in my solar system in 1998, so there was a huge swathe of tax on it, so we [Greenpeace] campaigned and got it down to 5%, so that was a successful campaign."* (Domestic Consumer/Eco-warrior).

The consensus was that by acting as pressure groups, grass-root activists had contributed to shaping the renewable energy subfield by negotiating with relevant authorities to advance the deployment of renewable energy in the UK.

In sum, this section identified those who had practised as institutional entrepreneurs as renewable energy practitioners/activists; incumbent energy practitioners; the state and its various departments such as DECC and Ofgem; and the European Union. Having identified those who had practised as institutional entrepreneurs, the next subsection provides the informants' view on the properties they possessed which had enabled them to do so.

5.2.4 Properties of Institutional Entrepreneurs

This subsection presents informants views on the qualities which enabled some actors to practise as institutional entrepreneurs. Four primary properties of the institutional entrepreneurs were identified in the data: (1) perseverant (incorporating resilient); (2) the ability to mobilise others; (3) persuasive; and (4) good management skills. In the manner referred to by respondents, properties relate to the special characteristics, abilities and qualities of the institutional entrepreneurs that enabled them to shape the renewable energy subfield. Of the four properties, the most commonly discussed was perseverant. In this regard, views were either expressed in terms of renewable energy practitioners being patient, and or determined, because investments in renewable energy tended to be long-termed, or, being resilient because the renewable energy subfield is fraught with challenges due to being an immature field. Here, the dominant frame was that renewable energy practitioners needed to be in the business for the long-haul, as this very successful CEO emphasised:

> *"I suppose blind determination is probably what we worked with, but also the ability to raise appropriately priced money. Investor must match investment, therefore, you must make sure that the investment that you are looking for people to invest in, that the money is right for that investment. There is no point in using VC [venture capital] money to invest in solar when solar is a boring predictable investment and therefore requires boring, predictable money."* (CEO- Major PV Developer).

Respondents also explained that some of the more successful practitioners possessed the ability to mobilise others. The dominant interpretive frame here relates to renewable energy practitioners having the capability to coerce others to support their renewable energy institutionalisation projects. While explaining how he garnered

support for his renewable energy ventures, one of Northern Ireland's more successful wind power developers reflected:

> *"There were five initial director shareholders of [anonymised] and we had skill-sets that allowed us to operate on the ground to interface with the electricity companies; the planning authorities; the landowners; all that sort of thing, but we didn't have the credibility with lenders and banks and things because we had no track record. We also did not have the full array of expertise required to pass on a wind farm project, so the strengths that we lacked we found in our partner RES, who were able to hold our hands and together we ticked all the boxes"* (Founder/CEO-Medium-sized Wind Power Developer).

Opinions were also voiced in terms of renewable energy practitioners being persuasive. This was however generally in relation to sales tactics. Here, the underlying belief was that because renewable energy is a relatively new technology with high capital costs, good sales tactics were essential to convince others to buy into the technology. Respondents also explained that some of the more successful renewable energy practitioners possessed good management skills. In this regard, the underlying view was that renewable energy ventures rely on the guidance of good managers because as with all business enterprises, good management is key. To underpin this opinion, one interviewee remarked:

> "*I think it comes down to good business sense. For example, the reason why the Mark Group and others went under, was because they had bad management. Yes, things are hard and there's less money, but you need to cull staff if needs be. You need to hire slow, fire fast and have really tight management of your finances."* (Founder/CEO- Community Energy Group).

The institutional biography of the informants also provided evidence of institutional entrepreneurs of having brought resources acquired in other fields to the renewable energy subfield. Of the thirty-nine participants interviewed for example, at least four had previously worked in the oil and gas sector. This did not however provide conclusive evidence that they were advantaged by this background because each actor performed differently. On the other hand, one of the more successful PV developers admitted that coming from a retail background may have contributed to his success because he had acquired the traits of perseverance and persuasiveness from that organisational field.

In summing up, this section has presented the categories related to research question 1. Four major findings emerged from the section:

(1) The renewable energy subfield had mostly been shaped by the institutional changes which had been enacted by the institutional entrepreneurs.

(2) Although institutional changes had taken place in the renewable energy subfield, it has only gained partial institutionalisation.

(3) Five broad categories of actors practised as institutional entrepreneurs during the period: (1) renewable energy practitioners/activists; (2) incumbent energy practitioners; (3) the state and its various departments such as DECC, Ofgem and the Environment Agency (4) the European Union, and (5) the United Nations.

(4) Since the newly created or reconfigured institution in the renewable energy subfield were misaligned and did not adequately support each other, they had minimal impact on reshaping the field of energy provision.

Having presented the main findings which emerged from this section, the next section presents the categories related to research question two.

5.3 THE INSTITUTIONAL ENVIRONMENT OF THE RENEWABLE ENERGY SUBFIELD IN THE UK

This section presents the two categories that emerged from the data collected to answer research question two: (1) Enabling Conditions; and (2) Institutional Constraints. The "enabling conditions" category relates to the informants' views on the factors which make the renewable energy subfield in the UK attractive or unattractive to operate in or served as triggers for institutional entrepreneurship. Interestingly, many of the institutional constraints emerged organically from the responses to the enabling conditions questions because of the interconnectedness of both factors. The "institutional constraints" category shares respondents' opinions on the factors which limit or restrict the behaviour of the stakeholders in the renewable energy subfield. Here is how the findings relate to each category.

5.3.1 Enabling Conditions

This subsection covers the "enabling conditions" category. Three categories of enabling conditions were identified from the data: (1) field-level conditions; (2) actors' social positions and (3) institutionalised structural myths. The lattermost enabling condition, institutionalised structural myths, manifested as both an enabling condition and institutional constraint and is therefore elaborated upon in the subsection that

follows. The field-level conditions are further aggregated into two categories: the precipitating jolts that initially triggered institutional entrepreneurship and current enabling conditions which facilitate the entry of new field occupants. The main precipitating jolts were environmental issues; renewable energy as a disruptive technology and regulatory upheaval in the form of EU and national energy policies. Environmental issues later became current enabling conditions, particularly for micro-hydroelectricity schemes. The four current field-level enabling conditions are policy certainty; state incentive schemes; environmental concerns such as high pollution levels and sociological issues such as the UK being an oil-based economy.

Interviewees agreed that energy policy certainty was the main factor that made the renewable energy subfield an attractive or unattractive organisational sphere in which to operate. Here, the dominant frame was that having a clear, long-term renewable energy policy provided investors with the confidence that it is safe to invest in renewable energy, as this typical quote illustrates:

> *"Policy certainty is the key thing for us. Like any business that's investing in anything, knowing where things are going to be today; tomorrow; in five years; ten; fifteen; twenty years is really important. It takes seven* [7] *years from starting on a project to starting to get it built, therefore a world where there is policy stability is critical."* (UK Country Manager- Multinational Energy Conglomerate).

Notably, respondents belonging to the offshore wind power sector believed that consecutive UK Governments had created the right enabling conditions through policy certainty. This view was however confined to respondents from this segment, with the consensus being that the renewable energy subfield was devoid of the right enabling conditions. Informants therefore recommended that policymakers should make the renewable energy subfield more attractive by implementing a long-term energy strategy that provides policy certainty. The data also suggest that there was a link between policymaking and agenda-setting. Relatedly, informants frequently pointed out that the renewable energy subfield was too attractive during the first round of subsidies (2010) and too unattractive following the subsidy cuts (2011 and 2016). The data show that this had had the effect of tempering the growth of the renewable energy subfield.

The triggers of institutional entrepreneurship were discussed in terms of the factors which initially motivated the institutional entrepreneurs to reshape the field of

energy provision in the UK. The majority of respondents felt that the main factor was environmental issues, as this typical quote illustrates:

"We've got to change the way we source our energy. One, because we are pumping carbon out, it isn't good for the environment, it can't be. The earth has been here for so long and it's got itself into a fairly nice balance, but we come along and offset that balance, be it by whatever foul means we put into it." (Commercial Consumer).

Respondents consistently pointed to the high pollution levels currently afflicting the UK, stressing that renewable energy could play a key role in addressing this problem. Many informants also believed that as a disruptive technology, renewable energy had influenced the UK in rethinking how it provided its energy, consequently, this might have been a trigger for institutional entrepreneurship. In this regard, respondents felt that the UK's energy system was outdated and in a state of decomposition, therefore it needed to be redesigned as a "new energy system", with renewable energy accounting for the largest share of the mix. Some participants expressed the view that national and EU environmental policies were the main triggers for changing the way the UK provides its energy. It was agreed across the responses that although these factors were motivators for institutional change, the main driver for entrepreneurship within the renewable energy subfield was the opportunity it presented as a relatively new, emerging field.

Respondents also identified enabling technologies as forms of technical innovations which facilitated the widespread diffusion of renewable energy. One commonly held view across the responses was that two enabling technologies, demand-side response and energy storage, were changing the conversation about the technological efficiency of renewable energy. Respondents explained that although renewable energy can be a disruptive technology[17]; prevailing myths, assumptions and beliefs; along with legitimate limitations (e.g. variability and intermittency), had hampered its widespread diffusion. It was however felt that its positive attributes outweighed those deficiencies, as this informant pointed out:

[Renewable energy] *"...doesn't lead to the depletion of that energy resource."* (UK Country Manager- Multinational Energy Conglomerate).

[17] A technology that displaces an established technology or creates a completely new industry (Christensen, 1997).

It was agreed across the responses, that these new, supportive technologies were nullifying arguments such as renewable energy is not capable of meeting baseload demand and that they were intermittent and variable.

In summary, this subsection has set out the typical views related to the enabling conditions category. It has shown that the main enabling conditions are: (1) field-level conditions; (2) actors' social positions and (3) institutionalised structural myths. Having identified the enabling conditions in this subsection, the next subsection documents the institutional constraints.

5.3.2 Institutional Constraints

This subsection sets out informants' views related to the "institutional constraints" category. Six major institutional constraints were identified across the interviewees: (1) poor energy infrastructure; (2) the poor credibility of the renewable energy subfield; (3) financial constraints; (4) sociological constraints such as the UK being an oil-based economy; (5) prevailing assumptions, myths and beliefs about renewable energy; and (6) environmental degradation. Typically, respondents' views on the institutional constraints were presented in terms of the controls that restricted or limited the diffusion of renewable energy across the UK, which had become entrenched.

One commonly held view was that the poor energy infrastructure was a major institutional constraint. Views were mainly expressed in terms of a mismatch between renewable energy and the existing electricity grid, with respondents often referring to the current infrastructure as the "old energy system". Informants generally attributed this constraint to the present infrastructure being specifically designed for centralised power generation, without renewable energy in mind, as this CEO remarked:

> *"The energy market in the UK was constructed when the only way to generate power was digging up the oil, take it to a plant, process it, flog it to users who want to buy as much as possible of the stuff you can produce and every year want to buy more... "....* "*Now we are in a different world where we are saying there is a cost to* (*a*) *system which is massive, which we need to address."* (Founder/CEO- Specialist RE Finance Company).

Respondents from Northern Ireland and Scotland felt that their regions were particularly constrained by the "old energy system" due to their geography. Those from Northern Ireland referred to this constraint as "*curtailment*" and explained that whereas the existing infrastructure was designed to move the energy from the east to

the west, most of the renewable energy resources are located in the west. Similarly, interviewees explained that whereas the majority of Scotland's renewable energy resources are located in the remote areas, the grid was designed to transmit the energy to urban areas.

There was also considerable discussion about the poor credibility of the renewable energy subfield. Broadly, respondents believed that rogue traders had entered into the subfield because they saw it as an opportunity to profit considerably within a short period of time. Interviewees were however quick to point out that this constraint was confined to the domestic solar PV segment and not the renewable energy subfield as a whole.

Informants also voiced their concerns about financial constraints. Views were either framed in terms of renewable energy practitioners being financially constrained because they had limited access to funding or, the technology itself being inhibited because of high capital costs. Limited access to funding was broadly attributed to renewable energy practitioners and renewable energy itself lacking track records. Interestingly, some respondents believed that access to finance for renewable energy ventures was not a constraint, however, this view was generally held by the more financially able respondents. "Old money" so to speak. Respondents who cited high capital costs typically based their views on renewable energy systems having comparatively high layout costs because energy provided by hydrocarbons and nuclear can be readily accessed from well-established infrastructures.

Interviewees also felt that some sociological factors were major institutional constraints. Generally, interviewees felt that the UK's economy is oil-based, consequently, fossil fuels are the technologies of choice. Respondents also quickly complained that the UK Government's conservative ideology has adversely impacted the diffusion of renewable energy. Opinions were typically voiced in terms of the UK Government prioritising capitalistic objectives over advancing the diffusion of renewable energy. Similarly, respondents felt that low oil prices were having a constraining effect on the renewable energy subfield. Informants generally believed that the oil and gas sector is controlled by a cartel (OPEC) which had artificially deflated the price of oil and this has made renewable energy less attractive. Respondents also spoke about planning requirements such as consents being a constraint. Frequently, interviewees regarded planning requirements as being a constraint because it was unnecessarily bureaucratic.

Informants commented regularly on the negative impact of prevailing assumptions, myths and beliefs about renewable energy. Responses were either presented in terms of the poor aesthetics of renewable energy systems such as solar PV modules or, local communities contesting renewable energy developments within their communities- the so-called "NIMBYS" effect. Many participants believed that these beliefs influenced central government's decisions to site wind farms offshore. The dominant frame was that this factor still posed a major constraint because it shaped people's perceptions about renewable energy. Although it was widely held that prevailing assumptions and beliefs about renewable energy were still constraining, the consensus was that this was receding as the technology gained wider acceptance by society.

Most respondents subscribed to the view that environmental degradation had a deleterious effect on society and by extension has a constraining effect on renewable energy deployment. Opinions were broadly framed in terms of anthropogenic activities having damaged the earth's natural ecosystem and this has forced the world to act. To underpin this view, respondents commonly cited climate change as a point of reference, often referring to the 2015 Paris Agreement and the recent spate of floods in the UK, as this typical excerpt illustrates:

> *"Even with the Paris Agreement, we are in line for a rise of three degrees in temperature within a century. That's incompatible with life as we know it. That's not environmentally sustainable. That's science. We see already what's happening in Cumbria, in Somerset, the forest fires across the globe, droughts across Southern Europe. It's already hitting us at a rate faster than we ever understood. We've lost something like seventy per cent of the Arctic ice cap, we are in red-alert mate and the alarm is ringing at level ten and we are reacting at level two. I mean it's very clear."* (Domestic Consumer/Eco-warrior).

While on the topic of environmental degradation, some respondents commented on the "energy trilemma" facing the UK, stressing the importance of the UK providing its energy sustainably. The agreement across the responses was that environmental concerns had served as one of the main catalysts for the emergence of the renewable energy subfield in the UK and motivated some actors to provide innovative solutions for the problem.

In summary, this section has set out the categories related to research question 2. The main finding is that institutionalised structural myths, such as policy certainty/uncertainty, have served as an enabling condition because they either motivated or demotivated actors from acting as institutional entrepreneurs. Having established the main enabling conditions and institutional constraints in this section, the next section covers the categories which emerged to answer the final research question.

5.4 GAINING ACCEPTANCE WITHIN THE FIELD OF ENERGY PROVISION IN THE UK

This section presents the five categories concerned with the third and final research question. To recall, these are (1) Intervention Strategies Employed; (2) Inertia to Change; (3) Overcoming the Paradox of Embedded Agency; (4) Carriers of Institutions; and (5) Legitimacy Building Strategies. The "institutional strategies employed" category synthesises the common themes relating to the deliberate actions taken by the institutional entrepreneurs to disrupt the institutions. The "inertia to change" category provides the more common views on the measures which may have been strategically implemented to maintain the existing institutional arrangements within the field of energy provision. The "overcoming the paradox of embedded agency" category encapsulates respondents' views on how some actors were able to envisage new practices and get others to adopt them, despite being constrained as embedded agents. The "carriers of institutions" category presents the findings which shed light on how the envisioned ideas were transmitted to the stage of becoming institutionalised. The "legitimacy building strategy" category subsumes the strategies used by some institutional entrepreneurs to gain acceptance for themselves and their activities. Each category is presented in the following subsections.

5.4.1 Intervention Strategies Employed

This subsection covers the "institutional strategies employed" category. The data provided evidence of seven intervention strategies being employed by three groups of actors. The three groups of actors were: (1) incumbent energy providers; (2) state departments; and (3) renewable energy practitioners. In the manner discussed by the interviewees, intervention strategies relate to the mechanisms used by actors to try and change the existing institutional arrangements in the field of energy provision in the UK.

The most commonly discussed intervention strategy was lobbying. According to the manner framed, respondents perceived that lobbying was operationalised as a type of manipulating institutional work purposively undertaken to influence others to support institutionalisation projects. The data show that lobbying was predominantly carried out by two sets of actors, renewable energy practitioners and incumbent energy firms. Respondents explained that renewable energy practitioners primarily lobbied through their representative trade associations such as RenewableUK because these organisations served as the collective voices of the renewable energy subfield and/or its sub-communities. While describing how trade associations lobbied central government for state support, this CEO explained:

> *"We tend to go through our trade associations* [such as] *RenewableUK. We have people who will talk to government ministers and will input to government consultations on behalf of the industry."* (CEO- Medium-sized Wind Energy Developer).

Respondents continually criticised incumbent energy firms for actively lobbying the Government to support the hydrocarbon and nuclear sectors, often running public relations battles to try and prevent the diffusion of renewable energy. The agreement across the responses was that the renewable energy practitioners had a weaker lobbying voice than the incumbents because they were "the new kids on the block" and were disadvantaged by being in that position.

Interestingly, some of the more successful renewable energy practitioners attributed their success to deliberately normalising and scaling renewable energy ventures, as these two well-known CEOs explained:

> *"There are a number of different ways of doing things and I think what we have done historically is try to connect renewables into the normal way of working."* (Founder/CEO-Major PV Developer). *"I think it's just a case of being able to deploy large-scale, whether it is wind or solar, which have been the main technologies generation assets."* (Founder/CEO- Specialist RE Recruitment Company).

Here, the underlying belief was that by mainstreaming and scaling-up renewable energy ventures, the technology was able to compete with conventional hydrocarbon technologies on costs due to economies of scale.

There was also evidence of renewable energy practitioners framing their arguments to invoke action or gain support. This CEO explained how he had managed to persuade the Financial Services Authority to support his renewable energy venture:

> *"There were a number of issues, but that was one of the big ones we had. We had to win a series of debates with the regulators before they authorised us. They authorised us in late two thousand and eleven* [2011] *and we launched in two thousand and twelve* [2012]." (Founder/CEO- Specialist RE Finance Company).

Some informants felt that their representative trade bodies were not particularly good at constructing their arguments, as this interviewee criticised:

> *"Probably with the solar industry, Solar Trade Association, they haven't been so clever. You can find the coverages where they said in the Daily Telegraph "the level of subsidies we get are probably higher than we need".* (Former DECC Advisor/ Communications Manager- Major UK Power Plant).

Many interviewees felt that it was not necessary to present a convincing argument about renewable energy to people who already have pre-existing opinions about the technology, therefore this was a pointless exercise. The consensus was that renewable energy practitioners were not particularly good at framing their arguments.

Similarly, interviewees agreed that the renewable energy practitioners were not particularly active and effective at educating others about why they should adopt renewable energy. One frequent reason given for this was that it was not their responsibility to do so. When asked whose responsibility this might be, many informants failed to identify a particular individual or organisations, but in most cases, felt that this was the responsibility of the state. There was however evidence of some practitioners engaging in educational work, as this respondent reflected:

> *"I think part of the process has been trying to educate end-users, as in customers, of the benefits of adopting a renewable energy strategy and obviously that there is a requirement to do a capital investment for the longer-term return improvement in their overall operating position through a reduction of their future energy costs."* (Head of Energy- Integrated Consultancy/Maintenance Company).

In spite of this, the consensus was that the educational measures employed by the renewable energy practitioners were lacking in construct, scope and deployment.

Respondents agreed that there was a lack of collaboration between renewable energy practitioners. Although a few interviewees explained that there was some intra-organisational cooperation between renewable energy firms and their respective trade organisations, generally it was felt that there was a lack of collaboration because of inter-community competition. Some respondents elaborated upon this, pointing out that the Contract for Difference undermined inter-community collaboration because it potentially compromised trade secrets.

There was also considerable debate about some actors in the field of energy provision (e.g. DECC; Ofgem; RE practitioners; incumbent energy providers; etc.) having created the institutions that had shaped the renewable energy subfield. Although the informants did not identify them as institutions, generally they were referring to institutions such as national energy policies; incentive schemes such as the FITs and some of the deeply entrenched beliefs about the renewable energy subfield, such as the dishonesty of many renewable energy practitioners. This typical quote exemplifies respondents' opinions:

> *"DECC has developed this thing called the Licence Lite, which stipulates that those operating on the grid need to be a licenced electricity operator, however only Npower and people like those are large enough to play that game."* (Founder/MD- Specialist Solar Developer and Consultancy).

In spite of this common view, some respondents felt that the renewable energy practitioners had not reshaped the field of energy provision at all, as this widely respected solar PV developer succinctly put it:

> *"We've conformed; we've tweaked, but on the whole conformed."* (Founder/CEO-Major PV Developer).

Participants were quick to express their frustration at not being able to change existing arrangements within the field of energy provision because DECC had not implemented the policies needed to facilitate this. Interviewees agreed that although some changes had indeed taken place within this organisational field, renewable energy practitioners had generally conformed rather than changed the rules.

Relatedly, the data show that actors who operated in both fields (oil and gas and the renewable energy subfield) did not actively promote renewable energy as a better alternative than hydrocarbon or nuclear technologies. This view was

underpinned by the absence of a suitable collective action frame[18] being used to provide compelling accounts of why renewable energy would have been a better alternative than its hydrocarbon and nuclear counterparts. A consistent reason provided for this was their obligation to remain neutral actors.

To summarise, this subsection has covered the Intervention Strategies Employed category. It has shown that the main intervention strategies used by the institutional entrepreneurs were lobbying; mainstreaming; framing; educating; collaborating and creating. The next subsection considers the Inertia to Change category.

5.4.2 Inertia to Change

This subsection presents the "inertia to change" category. Three sets of actors were identified as having use deterring tactics to try and prevent institutional change within the field of energy provision in the UK: state regulatory bodies; incumbent energy practitioners and District Network Operators [DNOs]. The findings in relation to each are presented in turn as follows.

Respondents felt that the main source of inertial pressures was the state through its organisations DECC; Ofgem; the Environment Agency (SEPA in the case of Scotland) and local planning authorities. In the manner in which they presented their responses, informants' views indicate that this was a deliberate form of "push-back" by these actors. Participants were quick to complain that lately the state had used mechanisms such as cuts in incentive schemes to stymie the growth of the renewable energy subfield for various reasons. One commonly cited reason was to deliberately temper the growth of the renewable energy subfield because the market had overheated and the UK was on course for meeting its 2020 renewable energy target, as this prominent CEO opined:

> *"The government tried every single trick in the book. They tried to cut the tariffs, look, the bottom-line basically is "whenever you are living in a tariff-based environment, not surprisingly, the powers that be that have got to pay the tariffs, if things are going the wrong way, they'll try to slow that up"* (Founder/CEO-Major PV Developer).

Another persistent reason was the state's recent prioritising of nuclear; natural gas and offshore wind. Interestingly, many respondents did not vehemently oppose nuclear

[18] A coherent interpretive structure that accomplishes punctuation, elaboration and motivation.

because of its low-carbon credential, however, some did voice their concerns about capital costs and the disposal of its waste. Small and medium-sized practitioners felt that they were particularly disadvantaged by this inertia because the state preferred to deal with a few large renewable energy players, rather than several small practitioners. Interviewees also complained about local planning authorities instituting measures to maintain the existing arrangements for energy provision because some technologies such as onshore wind were a blight on the local landscape. Subsequently, interviewees agreed that the main antagonist to change was the state, through its various regulatory bodies, because of vested interests.

Interviewees also felt that the Distribution Network Operators (DNOs) had deliberately initiated measures to inhibit change. Typically, informants felt that the DNOs were resisting change because the prevailing grid infrastructure could not cope, therefore they had initiated measures to decelerate the uptake of renewable energy. Some informants also felt that the DNOs were resisting change because going off-grid threatened their business model, as this interviewee claimed:

> *"...the fact that we require the District Network Operators* [DNOs] *to agree for the connection of the systems into the network, unless we can do a private wire off-grid connection, such that they have a vested interest in the supply of the energy in its traditional format. The fact that we are operating in a market where they* [DNOs] *have a vested interest in the supply of energy, rather than receiving it, is a bit of a dichotomy really."* (Head of Energy- Integrated Consultancy/Maintenance Company).

The consensus was that until there are considerable improvements in the grid infrastructure, the DNOs are likely to continue resisting change. It was therefore felt that renewable energy practitioners should use innovative solutions such as going off-grid to overcome this constraint.

In contrast, there were divergent views on whether or not incumbent energy firms had deliberately instituted measures to impede change. Those who felt that incumbent energy firms had employed measures to prevent change believed they had done so because of vested interests. Responses were generally framed in terms of incumbents having lobbied others to support measures initiated to prevent change, as this typical extract illustrates:

> *"The incumbents are the ones who don't understand energy; they are lobbying and fighting and they are running PR* [public relations] *battles and most of that*

> *is driven by the anti-climate change movement creating myths to try and keep the public confused and make sure that climate change isn't an issue that people get worked up about."* (Founder/CEO- Specialist RE Finance Company).

Contrarily, respondents who believed that the incumbent energy practitioners had not initiated measures to prevent change believed that it was not within their best interests to do so, because they also had considerable renewable energy assets. Further, the low oil prices at the time of the interviews deemed this unnecessary.

This subsection presented the "inertia to change" category. It has shown that the main antagonists to institutional change were state regulatory bodies; incumbent energy practitioners and District Network Operators [DNOs]. The next section presents the "overcoming the paradox of embedded agency" category.

5.4.3 Overcoming the Paradox of Embedded Agency

This subsection provides informants' main views on how the paradox of embedded agency was overcome. There were mixed views on how renewable energy practitioners dealt with the challenge of being embedded agents, however, the most common was that some renewable energy practitioners were able to do so by proving that renewable energy was a viable technological solution. Here, the main argument was that by attaining the status of being a proven technology, prevailing assumptions and beliefs which had cast doubts on the viability of renewable energy were eradicated. While justifying why biomass was a credible alternative to nuclear, this respondent boasted how the technology had helped to successfully displace coal at one of the UK's largest power plants:

> *"With biomass or gas, you can switch on the dial and give a bit more,* [whereas] *with nuclear you can't do that. Nuclear is very reliable, but it's constant."* (Founder/MD- Small-scale Biomass Supplier).

Although this may have contributed to the paradox being overcome, in this particular case, the organisation had still operated within the framework of being an incumbent energy provider and simply altered some aspects of the energy generation process to realise its institutionalisation project. In other words, this practitioner had converted some of its existing centralised, fossil fuel power plant to generate renewable energy. By so doing, it was able to avoid internal conflicts and contradictions because it generated both renewable and non-renewable energy.

There was also reference to some renewable energy practitioners having used innovation to deal with the constraint of being embedded agents. In this regard, interviewees typically framed their responses in terms of new ideas or methods being used to provide better solutions, or, overcoming institutional constraints. Interviewees agreed that innovation had helped some actors deal with the constraint of being embedded agents because this had helped them solve technology-based problems and improve the viability of renewable energy. For example, manufacturing larger, more efficient wind turbines.

Respondents pointed to some actors having used their social skills[19] to overcome the constraint of being embedded agents. In the manner presented by interviewees, this meant the collective stock of attributes possessed by actors. Interestingly, these attributes were sometimes acquired in other organisational fields. The data also provided evidence of some actors deliberately operating along the periphery to deal with the constraint of being embedded agents. After it had become apparent that the renewable energy subfield was fraught with opportunities and many new entrants had entered the field to capitalise on this, some renewable energy practitioners deliberately migrated to the fringes to operate from that position. Operating along the periphery, these institutional entrepreneurs kept ahead of the game by seeking out new opportunities in neighbouring fields and engaging in boundary bridging activities. Admittedly, these actors had earlier built-up their resources[20] and reputation by being early entrants to the renewable energy subfield.

In summary, this subsection has introduced the reader to the informants' views on how the paradox of embedded agency was overcome. It has shown that the main ways in which some actors were able to escape this constraint were: proving that renewable energy is a viable technological solution; innovation; actors' social skills and possessing personal resources such as financial capital. Having considered how the paradox of embedded agency was overcome in this subsection, the next subsection covers the "carriers of the institutions" category.

5.4.4 Carriers of the institutions

This subsection introduces the reader to the "carriers of the institution" category. The category provides evidence of four types of carriers being used to transmit the

[19] The ability to mobilise others for support with institutional change projects.
[20] Financial; social; human capital

institutionalisation ideas: symbolic systems; relational systems; routines and artefacts. Respondents' views indicate that relational systems were the most commonly utilised carriers because renewable practitioners were motivated to enter into the field for financial reasons. Typically, informants believed that many actors had sought to shape the renewables subfield because of the opportunities it presented, as this respondent tersely put it:

> *"Money."* (Assistant MD- RE Consultancy/MCS Certifier).

Here, the dominant frame was that practitioners had entered into the subfield because of its scope for entrepreneurial activities due to being a relatively new area of activity:

> *"Yes, there are some who believe that they want to save the planet, but for the majority of us I would safely say it's about a business opportunity that's a growing one for the future."* (Founder/MD- Small-scale Biomass Supplier).

There was also evidence of other types of relational systems being used to transport institutions. In this respect, one of the most widely discussed was the intermediary role of various trade associations. Typically, responses centred on trade associations having influenced policy and serving as facilitators for collaboration between renewable energy practitioners and other actors. Respondents generally referred to their representative trade bodies, but the most frequently discussed was the Solar Trade Association (STA) because the majority of respondents belonged to the solar sub-community. Views on the utility of the STA were however mixed and tended to be dependent on the size of the practitioner or their level of success. Generally, the large-scale practitioners believed that their respective trade associations were effective and efficient, whereas smaller renewable energy practitioners were critical. Respondents who viewed their respective trade bodies positively typically framed their opinions in terms of its utility as a collaborative network. Contrarily, disapproving respondents criticised their associations for being simply profit-driven organisations, rather than serving as facilitators for the diffusion of renewable energy. While explaining why he was not a member of the STA, this CEO complained:

> *"We would have joined it but they wanted I think it was about seven or eight hundred pounds just to join it. Just for a year and we thought if it was a company that wanted to help all the installers, then it wouldn't be charging that sort of money."* (Founder/CEO- Small-scale PV Installer).

Participants were vocal about renewable energy practitioners belonging to relational networks. These networks ranged from formal groups such as the Low-carbon Board, to informal forums such as blogs. The underlying view was that these networks serve as conduits for renewable energy practitioners to connect with others on matters relating to renewable energy. Interviewees agreed that these networks played crucial roles in renewable energy practitioners interconnecting to exchange information and developing professional contacts, as this broadened their access to opportunities and strengthened their collective voices.

There was also evidence of artefacts being used to transport the institutional ideas. In this regard, the most commonly discussed mode was renewable energy becoming a viable technological form. To underpin their arguments, interviewees often referred to the reduction in solar PV prices, pointing out that it had progressed to the stage of reaching grid parity. In a similar vein, participants mentioned the cost-effectiveness of offshore wind. The agreement across the responses was that renewable energy had in recent years provided objective proof of its viability.

Evidence was also found of symbolic systems being used as conduits to transmit institutions. Here, many informants felt that most actors had been motivated to reshape the field of energy provision in order to comply with the law. Responses were generally framed in terms of the need to meet legislative requirements, as this typical quote illustrates:

> *"It's legislation. Just legislation. Corporate citizenship also plays a role. Everyone has to be seen to be clean and green these days."* (CEO/Commercial Director- WtE[21] (Start-up)).

Respondents identified state departments such as DECC and Ofgem, and private sector organisations such as the National Grid and the DNOs, as the primary regulators within the field. The consensus was that some of these departments had deliberately changed the rules to undermine the legitimacy of renewable energy practitioners, thus cauterising the growth of the field, as this CEO complained:

> *"DECC treats the renewable energy industry as if we are the enemy. It is as if they take it personally that we have exceeded their predictions, where that is obviously what we are supposed to do."* (Founder/CEO- Small-scale Solar PV Installer).

[21] Waste to Energy

Interviewees also spoke unreservedly about the standards and rules which guided acceptable behaviour within the renewable energy subfield. Many explained that these were the technical standards which renewable energy practitioners and systems were obligated to meet, or, as the informal, unwritten rules which guided normal behaviour within the field. One of the most commonly discussed technical standards was the Microgeneration Certification Scheme (MCS), however, there were mixed views on its effectiveness as an enforcing mechanism. Respondents who believed that the scheme was effective typically framed their opinions in terms of its robustness, as this CEO remarked:

> *"They go on to site and look at the installations you have done and assess everything you have done in order for you to do it year on year. So, we are quite heavily regulated."* (Founder/CEO- Small-scale PV Installer).

The scheme was however criticised by some respondents for only being applicable to renewable energy systems fifty kilowatts or less and being poorly enforced.

Respondents also pointed to the Renewable Energy Consumer Code (RECC). Some described it as a scheme used to regulate the ethical behaviour of MCS-certified installers, however, both the MCS and RECC were criticised by some respondents for their perceived fallibilities:

> *"They are finding loopholes. So, they have a sales company that isn't registered, that sales company then subs out the work to an MCS certified company to do it, but they are not meant to do that anymore. But because the contracts are with one company, if anyone complains about the sales methods there is no mechanism for RECC or MCS to actually find out who this unregistered Sales Company is actually employing to do this installation."* (Founder/CEO- Small-scale PV Installer).

Generally, the underlying belief was that the structure for monitoring and enforcing the rules within the renewable energy subfield was weak. Interviewees agreed that the deficiencies of the MCS and RECC were not so much due to their structural forms, but rather in their enforcement and the porosity of the borders of the renewables subfield. In contrast, some informants felt that standardisation had improved efficiency within the renewables subfield, however, this tended to be the view of the larger players:

> *"Standardisation is another* [area] *where we have started to standardise on certain pieces of equipment to make the costs come down."* (UK Country Manager- Multinational Energy Conglomerate).

Respondents agreed that standardisation was one of the key means by which renewable energy can be transformed from niche to mainstream because it improves efficiency and drives down costs.

Although evidence was found of routines being used to transport the institutional ideas (e.g. the professionalisation of the field), the findings indicate that due to being an immature technological field, there was a paucity of information to serve as institutional scripts and this may have limited their effectiveness as carriers. The consequence of this was that some actors and organisations struggled to find objective proof to assist with their decision making. Here, an unusual phenomenon was observed whereby actors engaged in "boundary spanning" activities to rationalise their decision-making process by borrowing logics from more mature fields to aid their decisions. One householder for example, stated that she had decided to purchase a German PV system instead of a Chinese model, because of Germany's engineering prowess in terms of motor vehicle production.

This subsection has presented the "carriers of institutions" category. It has shown that the main carriers used to transmute the institutions during the institutionalisation process were symbolic systems; relational systems; routines and artefacts. Having identified the carriers in this subsection, the next subsection covers the "legitimacy building strategies" category.

5.4.5 Legitimacy Building Strategies

This final subsection presents the informants' main views on the legitimacy building strategies used by actors to gain acceptance for themselves and their activities. Five legitimacy building strategies were identified: (1) theorising; (2) proving the viability of renewable energy; (3) renewable energy practitioners being honest and honourable; (4) being regulated; and (5) creating jobs. Conversely, three delegitimising factors were also identified: (1) the unethical behaviour of renewable energy practitioners; (2) prevailing misconceptions and beliefs about renewable energy; and (3) subsidy cuts (incorporating job losses). This subsection now considers each.

The most commonly described legitimacy building strategy was theorising. Although the informants did not use the term "theorising", they frequently explained that renewable energy practitioners had promoted renewable energy by pitching it as

one of the "green" solutions to the problem of climate change. Responses were also framed in terms of some people having installed renewable energy because "*it is the right thing to do*":

> *"Yeah, you know, you're trying to do the right thing".* When probed further*: "... trying to save the environment. Not for me, but probably [for] my grandchildren and great-grandchildren*" (Domestic Consumer).

Many informants explained that renewable energy was now more widely accepted because the viability of some renewable energy technologies had been proven. Usually, renewable energy practitioners used the argument of increased efficiency; deployment and cost competitiveness to legitimise renewable energy as a form of energy provision, as this respondent rationalised:

> *"The proof of the pudding is in the eating and this will cause more and more deployment* [of renewable energy]*, which will have the effect of economies of scale bringing down the costs."* (Development Manager- Intercontinental RE Company).

Offshore wind has been particularly successful in legitimising renewable energy because it had consistently proven its viability through increased efficiency. Its legitimacy was also strengthened by being an "invisible" technology, a characteristic which has enabled it to win the support of the state and the public, especially the "NIMBYists". The agreement however, was that factors such as the high capital cost of renewable energy, made it difficult to compete with competing with technologies which had established pipelines (e.g. centralised, fuel stations, etc.). This suggests that renewable energy had only attained partial legitimacy in the UK during the period.

Some participants felt that renewable energy practitioners had gained acceptance because they were regulated. To underpin this claim, they cited the passing of due diligence exercises as evidence of this. Opinions were sometimes presented in terms of regulatory sanctioning, as this respondent reflected:

> *"By being regulated investors, we have a certain amount of protection that we are doing our job correctly and we are going through the right process to bring a project to the market."* (Founder/CEO- Specialist RE Finance Company).

Interviewees also stressed the importance of being honest and transparent, pointing out that this supplanted any uncertainties about the credibility of renewable energy practitioners. It was also mentioned that some renewable energy practitioners had been

recognised for their contribution to society by being bestowed with national honorary awards. Some informants mentioned that this enhanced their credibility.

Some of the most significant findings were however inadvertently provided by the respondents. Typically, respondents explained that jobs created by renewable energy projects had portrayed the subfield in a positive light. Here, the dominant frame was that renewable energy has contributed significantly to the UK's economy by creating thousands of jobs:

> *"...we're generating thousands of jobs in the UK; so if you like, we are the new industrial revolution. That's the argument I would say, at least. Thirteen thousand [13,000] jobs already, with many more to come."* (UK Country Manager- Multinational Energy Conglomerate).

In spite of this, informants agreed that renewable energy was still not the technology of choice in the UK, which suggests it had only attained partial legitimacy. Although there is evidence of some renewable energy practitioners having gained legitimacy, the data suggest that a number of delegitimising factors prevented others from doing so. Three main delegitimising factors are: (1) the unethical behaviour of renewable energy practitioners; (2) prevailing misconceptions and beliefs about renewable energy; and (3) subsidy cuts (incorporating job losses). Views on the first factor were generally presented in terms of rogue renewable energy practitioners wrongfully using subsidies to legitimate their selling activities. Respondents explained that this discredited the subfield because in many cases, returns on investments were not as promised. The dominant argument on the misconceptions and beliefs was that this undermined legitimacy and was usually based on the belief that renewable energy was over-subsidised. Interviewees also felt that subsidy cuts had undermined the legitimacy of the renewable energy subfield for two main reasons. First, the subfield was no longer regarded as an attractive place to invest in, and second, the job losses caused by the subsidy cuts. The consensus was that these delegitimising factors had contributed to stymying the growth of the renewable energy subfield.

In summary, this subsection has presented the "legitimacy building strategies" category. The main finding to emerge is that although renewable energy practitioners had employed a number of legitimacy building strategies, both they and renewable energy had only attained partial legitimacy in the UK. Given the significance of this

and the other findings that emerged from the empirical data, the next section provides a summary of the more significant ones.

5.5 SUMMARY OF THE FINDINGS

This chapter presented the findings of the empirical research. The eight significant findings are:

(1) The renewable energy subfield had mostly been shaped by the institutional changes which had been enacted by the institutional entrepreneurs.

(2) Although institutional changes had taken place in the renewable energy subfield, it has only attained partial institutionalisation.

(3) Five broad categories of actors practised as institutional entrepreneurs during the period: (1) renewable energy practitioners/activists; (2) incumbent energy practitioners; (3) the state and its various departments such as DECC, Ofgem and the Environment Agency; (4) the European Union and (5) the United Nations.

(4) Since the newly created or reconfigured institution in the renewable energy subfield were misaligned and did not adequately support each other, they had mimimal impact on reshaping the field of energy provision.

(5) Institutionalised structural myths, such as policy certainty/uncertainty, was the main existential enabling condition which either motivated or demotivated actors from practising as institutional entrepreneurs.

(6) The six main institutional constraints were (1) poor energy infrastructure; (2) the poor credibility of the renewable energy subfield; (3) financial constraints; (4) sociological constraints such as the UK being an oil-based economy; (5) prevailing assumptions, myths and beliefs about renewable energy; and (6) environmental degradation

(7) Renewable energy practitioners mainly conformed because they lacked the power and resources to enact institutional change. Generally, renewable energy practitioners inappropriately employed their intervention strategies, consequently most remained afflicted by the paradox of being embedded agents.

(8) In order to gain legitimacy for themselves and their activities, some actors from the field of energy provision in the UK employed legitimacy building strategies such as creating jobs and being regulated, however, renewable energy and the renewable energy subfield only attained partial legitimacy. The renewable energy subfield in the UK only attained partial legitimacy because the state failed in its facilitative role to

create the right enabling conditions for the field; trade bodies were poor advocates and delegitimising factors such as the lack of incentives prevented renewable energy from gaining complete acceptance.

Since the findings of this chapter are pertinent for providing an understanding of the phenomenon being investigated, the next chapter synthesizes and discusses what they mean.

CHAPTER SIX

DISCUSSION

6.1 INTRODUCTION

This chapter employs institutional entrepreneurship theory to synthesise and discuss the findings in light of the research questions, literature review and theoretical framework. By so doing, it determines whether the literature corresponds with or contradicts the findings, discusses any discoveries which were not anticipated when the thesis was first described and seeks to provide fresh insights by engaging in a systematic search for competing explanations.

The chapter is organised as follows. Following the introduction, Section 6.2 presents a process map of institutional entrepreneurship in the renewable energy subfield in the UK for the period 1986-2016. This is aimed at helping the reader visualise how the process of institutional entrepreneurship unfolded and also builds on the theoretical framework presented in chapter 2 by connecting theory to process. Section 6.3 discusses the role institutional entrepreneurs may have played in shaping the renewable energy subfield and the impact this may have had on the field of energy provision. By so doing, it attempts to answer the first research question. Section 6.4 attempts to answer the second research question by investigating the conditions which may have triggered or inhibited institutional entrepreneurship in the renewable energy subfield and the field of energy provision. Section 6.5 aims to answer the third research question by discussing how the renewable energy subfield and its organisational elements may have gained legitimacy. Section 6.6 closes the chapter with a set of summarising remarks.

6.2 A PROCESS MODEL OF INSTITUTIONAL ENTREPRENEURSHIP IN THE RENEWABLE ENERGY SUBFIELD IN THE UK, 1986-2016

This section presents a process model of institutional entrepreneurship in the renewable energy subfield in the UK for the period 1986-2016. It aims to inform the reader about how institutional entrepreneurship unfolded during the period and is based on the collated findings of the two data collection methods. The model, which develops on the theoretical framework presented in chapter 2, is presented along the following building blocks:

(1) Enabling conditions- These are the three enabling conditions which either motivated or demotivated actors in the field of energy provision from practising as institutional entrepreneurs: actors' social positions; field-level conditions and institutionalised structural myths, elaborated upon thusly.

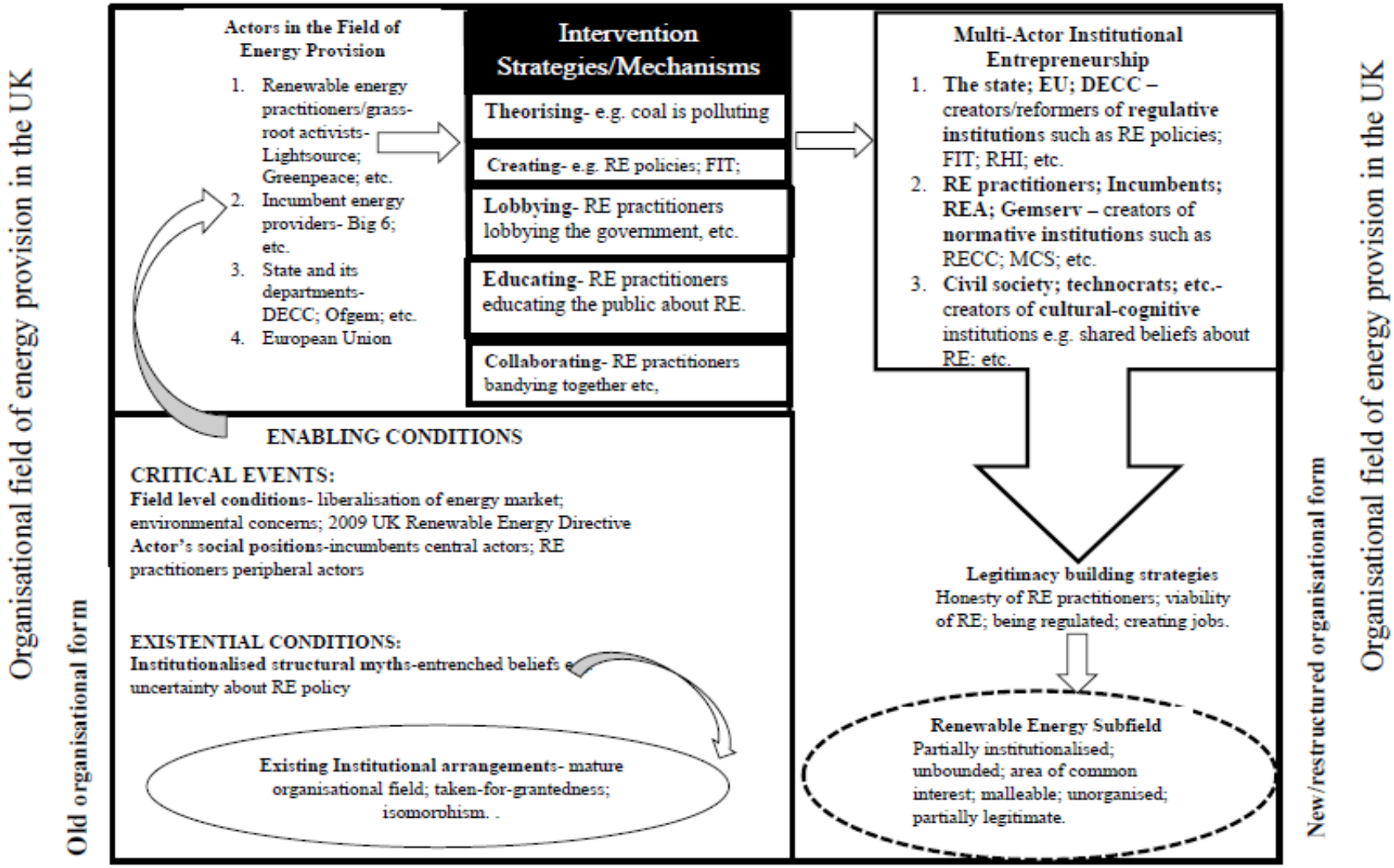

Figure 8: A Process Model of Institutional Entrepreneurship in the Renewable Energy Subfield in the UK, 1986-2016

(2) **Field-level conditions**- three exogenous field-level conditions might have triggered institutional entrepreneurship during the period: (1) liberalisation of the energy market; (2) environmental concerns; and (3) the UK Renewable Energy Directive 2009.

(3) **Actors' social positions**- This refers to the position occupied by the various actors in the field of energy provision in the UK. The state and its various departments (e.g. DECC, Ofgem and the Environment Agency, etc.) and the incumbent energy providers (e.g. the Big 6) were central, elite actors, whereas renewable energy practitioners and grass-root activists were peripheral, fringe actors. The findings show that the positions occupied by the actors had a direct influence on their interests and ability to envision and enact institutional change, in that while some central actors had the desire; resources; agency and power to enact institutional change, they did not necessarily do so. It is however, being emphasised here, that some central actors (e.g. some incumbents) did practise as institutional entrepreneurs due to having considerable renewable energy assets. The thesis also found that in most cases the peripheral actors (typically pure-play renewable energy practitioners) had the desire to enact institutional change, but mostly lacked the resources, power and agency to do so.

(4) **Institutionalised structural myths**- These were entrenched cultural-cognitive institutions such as public policy uncertainty; assumptions and misconceptions about renewable energy and the belief that renewable energy practitioners were dishonest. These institutionalised structural myths mostly had the effects of discouraging actors from investing in renewable energy in the case of public policy uncertainty and hindering the uptake of renewable energy in the other cases. In spite of these constraints, some field actors were motivated to try and change or transform existing institutional arrangements in the field of energy provision.

(5) **Field actors**- Actors such as the state and its various agencies (e.g. DECC; Ofgem; Environment Agency; etc.); renewable energy practitioners/grass-root activist; incumbent energy providers and other industry actors such as Gemserv and the Renewable Energy Association, were motivated by the enabling conditions to either create or transform existing institutional arrangements in

the field of energy provision by enacting institutional change. These field actors used intervention strategies to institute and implement their changes.

(6) Intervention strategies/mechanisms of action- These are the patterned actions used by the institutional entrepreneurs to try and change the field of energy provision. The intervention strategies used included creating, theorising, educating and collaborating. These strategies had varying degrees of success. For example, theorising was effective in helping to deinstitutionalise coal; whereas educating had very little effect on increasing the uptake of renewable energy in the UK. The reason for the ineffectiveness was attributed to the intervention strategies being inappropriately deployed, nevertheless, some actors were able to enact institutional change through a process of multi-actor institutional entrepreneurship.

(7) Multi-actor institutional entrepreneurship- The brand of "multi-actor institutional entrepreneurship" practised by the institutional entrepreneurs involved the various field actors creating the different types of institutions. For example, the state and its various regulatory organisations such as DECC created regulative institutions such as national renewable energy policies; normative institutions such as certification schemes and the professionalisation of the renewable energy subfield were typically created by field actors such as the Renewable Energy Association and Gemserv. The cultural-cognitive institutions, such as the shared misconceptions and beliefs about renewable energy were often created by civil society and technocrats. In this particular case, the type of multi-actor institutional entrepreneurship that occurred was not simply a case of dominant actors imposing their institutional change projects on the less powerful, but rather an interactive, bargaining process for negotiated, divergent institutional changes.

(8) Legitimacy building strategies- The legitimacy strategies employed by the institutional entrepreneurs to gain acceptance for themselves and their activities included proving the viability of renewable energy; being regulated; creating jobs and being honest renewable energy practitioners. Although these strategies helped to institutionalise some of the new practices, they were offset by delegitimising factors such as job losses and the dishonesty of many renewable energy practitioners. Consequence to this, the renewable energy subfield only attained partial institutionalisation and partial legitimacy.

(9) Partial institutionalisation- Being only partially institutionalised meant that renewable energy and the renewable energy subfield only exhibited some, but not all, of the characteristics and features of being institutionalised. This status had the main effects of limiting the growth and development of the renewable energy subfield, the deployment of renewable energy in the UK to be "patchy" and caused both renewable energy and its subfield to be only partially legitimate entities.

Based on the process model and the salient findings of the analysis, the following summarising remarks are now made.

6.2.2 Summary

This section presented a process model of institutional entrepreneurship in the renewable energy subfield in the UK during the period 1986-2016. Five themes are central to the model and analysis of the collated data: (1) the renewable energy subfield in the UK only attained the status of being partially institutionalised; (2) the misalignment of institutions in the renewable energy subfield contributed significantly to its partial institutionalisation; (3) the institutional changes in the renewable energy subfield occurred through a process of multi-actor institutional entrepreneurship; (4) institutionalised structural myths were some of the main enabling conditions which either motivated or demotivated institutional entrepreneurship in the renewable energy subfield; and, (5) renewable energy and the renewable energy subfield were only partially legitimate entities. Given the centrality of these themes, the thesis now elaborates upon them and the analysis of the other findings in relation to the research questions.

6.3 THE ROLE OF INSTITUTIONAL ENTREPRENEURS IN SHAPING ORGANISATIONAL FIELDS

This section closes the gap in knowledge by discussing the findings related to the first research question: "How might have institutional entrepreneurs shaped the renewable energy subfield in the UK during the period 1986-2016 and what impact may this have had on the field of energy provision?" As the process model shows, institutional entrepreneurs shaped the renewable energy subfield by playing a facultative role in its institutionalisation, however, this had limited effect on reshaping the field of energy provision in the UK. This limited impact may be attributable to the renewable energy subfield being only partially institutionalised. Due to being partially institutionalised,

the renewable energy subfield had a number of unique characteristics which may have limited its effectiveness, as the next subsection explains.

6.3.1 The Partial Institutionalisation of the UK Renewable Energy Subfield

As established by the literature review, highly institutionalised entities have the characteristics of being pervasive; self-reproducing; permanence and are consumed in a taken-for-granted way (Dacin and Dacin, 2008; Jepperson, 1991; Meyer and Rowan, 1977). Conversely, non-institutionalised entities are absent of social order; in a state of social entropy[22]; are not widely dispersed; lack stability and are less likely to survive and self-reproduce (Dacin and Dacin, 2008; Jepperson, 1991). The characteristics of partially institutionalised fall between those two states by being moderately stable; are patchily dispersed; are embedded in intermediate relational networks; reproduce moderately and have moderate survival rates (Genus, 2012). This is not a new discovery, because Genus (2012) observed this phenomenon in the microgeneration sector in UK, however, this is the first time it is being reported in the renewable energy subfield in the UK. The state of being partially institutionalised had manifold implications for the renewable energy subfield in the UK.

First, being moderately stable suggests that had the renewable energy subfield experienced any major external shocks, its growth and development are likely to have been compromised and its survival would have been threatened (Dacin and Dacin, 3008). This effect manifested when the deployment of renewable energy in the UK shrunk by 0.2% in 2016 over the previous year due to a pause in the feed-in-tariff scheme between 15 January to 7 February 2016 (inclusive) and a deployment cap being placed on all renewable energy technologies in 2016 (BEIS, 2017d). Second, due to being patchily dispersed, there was a lack of symbolic scripts (Scott, 2001) to convey the message that adopting renewable energy was the right thing to do (Suchman, 1995). This is likely to have stifled the development of renewable energy across the UK since this prevented its adoption from being considered the norm (Scott, 2001). Third, by being embedded in an intermediate rather than a widespread relational network, it is likely that there were gaps in the transmission of the message that adopting renewable energy was the right thing to do (Dacin and Dacin. 2008; Suchman, 1995). Had renewable energy acquired the status of being fully institutionalised, it is likely that its uptake would have been considerably more since

[22] Social entropy- a breakdown of the governance system, resulting in lawlessness.

its adoption would have been widespread, without any questions being asked about factors such as its efficiency and cost (Suchman, 1995). Finally, had renewable energy been fully institutionalised, it is likely that its deployment would have been exponential. This is likely to have had the effect of increasing the deployment of renewable energy considerably, because exponential growth causes organisational entities to grow more rapidly, typically doubling in size.

As the findings show, due to being only partially institutionalised the renewable energy subfield had the main characteristics of being malleable; relatively fragile; unorganised and unstructured. Being malleable is likely to have made the renewable energy subfield open to being shaped by actors in the field of energy provision in the image they see fit. As established by the literature review, central to institutional entrepreneurship theory is the relationship between institutions, interests and agency (Maguire *et al*., 2004), in that new institutions arise when organised actors with sufficient resources seize the opportunity to achieve interests they value highly (DiMaggio, 1988). This suggests that some actors may have deliberately shaped the renewable energy subfield to suit their vested interests, rather than to satisfy the shared vision of the entire field. For example, the findings have shown that after the second wave of austerity measures in 2013, nuclear, natural gas, and by exception, offshore wind, were promoted heavily by the state for the UK's future energy provision. This effect might have been compounded by the renewable energy subfield being a relatively unorganised organisational sphere, occupied by disparate actors with misaligned interests (Greenwood and Suddaby, 2006). In such a situation, legitimacy is likely to have been broadly based around a narrow set of attributes that resonated with only some actors (Maguire *et al*., 2004), rather than the entire field. This may have caused disparate goals to be pursued, thus limiting the capacity of the renewable energy subfield to reshape the field of energy provision more significantly. After all, institutional change requires the collective effort of actors to infuse new norms, beliefs and values into social structures (Rao *et al*., 2000).

The characteristic of a lack of structure[23] may have also affected the institutional agency of the renewable energy subfield. Referred to in this way, institutional agency means the capacity to act or intervene to produce a particular effect (Emirbayer and Mische, 1998), in this particular case, reshape the field of energy

[23] Structures: The rules and resources organised as properties of social systems.

provision. As established by the literature review, it is essential that there is a rule system in fledgling technological fields to confer property rights, define the criteria for access to resources and make provision for monitoring and enforcement (Lawrence and Suddaby, 2005). An important finding of this thesis was that because the renewable energy subfield lacked structure, the actions of some practitioners such as rogue traders and elite actors (e.g. "old money") were not appropriately policed during the period. This had the effect of compromising the ownership of property rights and delegitimising the renewable energy subfield. Institutional entrepreneurship theory provides a plausible explanation for this. Behaviour in organisational fields tends to be regulated by institutions which serve as organising structures (DiMaggio and Powell 1983) to manage property rights (Lawrence and Suddaby, 2005; North, 1987). Had the renewable energy subfield been fully institutionalised, it is likely that it would have had a suitable structure to manage property rights (North, 1987; Coase, 1960), thus preventing its legitimacy from being compromised (Suchman, 1995). As the findings suggest, five main factors may have caused the renewable energy subfield to acquire the status of being only partially institutionalised: (1) the misalignment of the institutions; (2) its embeddedness; (3) the porosity of its borders; (4) renewable energy practitioners conforming rather than changing the rules; and (5) structuring organisations such as DECC not being institutionalised. Each factor is now considered in turn.

To recall, the thesis found that three broad categories of institutions were created during the period- regulative institutions, normative institutions and cultural-cognitive institutions (Scott, 2001). These institutions may be more broadly grouped as formal or informal, with the former being encoded institutions communicated through established channels; and the latter being unwritten social norms, customs or traditions that shape behaviour and thought (North, 1990). Formal and informal institutions can either complement, overlap, undermine or substitute each other (Palthe, 2014). In fledgling technological fields, such as the renewable energy subfield, it is essential that the normative and cultural-cognitive institutions support the regulative ones because the formal institutions tend to be limited in scope; subject to contestation and/or undeveloped (Sine *et al.,* 2005). In this case, the findings indicate that the informal institutions did not adequately complement the formal ones, and in some instances undermined them. For example, the regulative institution of state incentive schemes was funded by levies on customers' utility bills, however,

consumers did not contest this on the basis of renewable energy being a cleaner technology than hydrocarbons. This legitimacy was however undermined by the pervasive belief that renewable energy was over-subsidised, a myth many informants claimed was being perpetuated by incumbent energy firms. As Meyer and Scott (1983) usefully point out, organisational forms which incorporate institutionalised myths are more legitimate, successful and likely to survive. In sum, the theory being proposed by this thesis is that the misalignment of institutions in organisational fields weakens their overall structures (Giddens, 1984); affects their prospects of becoming fully institutionalised (Dacin and Dacin, 2008; Jepperson, 1991; Meyer and Rowan, 1977) and decreases their legitimacy (Markard *et al*., 2016).

As the findings indicate, the two likely causes of the misalignment are: (1) a lack of normative and cultural-cognitive institutions to serve as support mechanisms for the regulative institutions; and (2) some cultural-cognitive institutions undermining the regulative and normative institutions. In the former case, this is likely to have caused a lack of suitable institutions to serve as moral compasses for how things should have been done in the renewable energy subfield, whereas in the latter case, destabilising cultural-cognitive institutions (e.g. the perceived inadequacy of the RECC) are likely to have undermined the legitimacy of normative institutions such as certification and the professionalisation of the field (Scott, 2014). As the findings suggest, the combined effect of this was a weakening of the legitimacy of the entire renewable energy subfield (Suchman, 1995). This outcome supports the proposal that in fledgling technological fields, both formal and informal institutions must be appropriately aligned to assist the field in transcending to the state of being fully institutionalised[24]. This notion supports Sine *et al.* (2005) finding that the correct alignment of institutions was an important antecedent for the emerging independent power sector gaining legitimacy in the USA. However, it has not been previously described in studies that examined institutional entrepreneurship in renewable energy subfields in other empirical settings.

Another factor which may have contributed to the renewable energy subfield being only partially institutionalised was its embeddedness. As the findings show, the renewable energy subfield was embedded within the more highly institutionalised field

[24] Institutionalised: A social process; actuality; or obligation that has a rule-like status in social thought and action. Characterised as being widely followed, without debate and exhibit permanence (Greenwood *et al.,* 2008)

of energy provision. While the renewable energy subfield had the institutional logic that the UK should provide its energy mainly from renewable energy sources, the field of energy provision had the competing logic that the UK should provide its energy from fossil fuels, nuclear and offshore wind power. This posed the dilemma of embeddedness. Like the paradox of embedded agency, this raised the question of "*how can entrenched subfields change the status quo in the mature fields in which they are embedded*?" The findings suggest that changing the dominant institutional logic may have been a solution for this (Hoffman, 1999). As the literature review established, competing logics[25] can facilitate resistance to institutional change (Thornton and Ocasio, 2008) because latent logics tend to be suppressed by dominant ones (Hoffman, 1999). Based on this discovery, this thesis proposes the idea of an organisational subfield. In this regard, the subfield is an organisational sphere constrained by being embedded within an overarching field. The notion of an organisational subfield connotes the idea of subordinacy, whereby actors belonging to the subfield are obligated to complying with rules of the overarching field in which the subfield is embedded. This can be particularly constraining if the overarching field has a more dominant institutional logic. Typically, the overarching field in which the subfield is embedded comprises several subfields jostling for dominance, using strategies such as agenda-setting to promote interests they value highly (DiMaggio, 1988). For a subfield to be fully institutionalised, it must overcome being constrained by the dominant institutional logic, especially in fields with competing logics (Thornton and Ocasio, 2008). This proposal is supported by Reay and Hinings' (2005), who also found that competing logics caused the Canadian healthcare field to be a highly conflictual domain, and field-level institutional change was only achieved after a power-sharing agreement had been brokered between the state and physicians. Not only does this suggests that competing logics create dysfunctional fields, it also indicates that they may hinder a subfield from becoming fully institutionalised (Dacin and Dacin, 2008; Jepperson, 1991; Meyer and Rowan, 1977).

The porosity of the boundaries of the renewable energy subfield may have also contributed to its partial institutionalisation. As the findings show, there were no set boundaries for membership for those wishing to practise in the renewable energy subfield (Lawrence and Suddaby, 2005). For example, many rogue traders were able

[25] Competing logics: Contradictory sets of principles by which meaning is provided to social reality.

to enter into the subfield and trade, without being adequately vetted. This might have delegitimised the renewable energy subfield as the invasion of "charlatans" eroded consumers' trust (Suchman, 1995).

The conformance[26] of renewable energy practitioners may have also contributed to the renewable energy subfield being only partially institutionalised. As the findings show, many renewable energy practitioners conformed rather than changed the rules (Jepperson, 1991) about how energy should be provided in the UK. This inaction may have contributed to upholding the perception that it was still socially and culturally acceptable for energy to be provided by fossil fuels (Scott, 2014). In other words, because the practice of fossil fuel usage was so culturally entrenched, its level of legitimacy remained high (Deephouse and Suchman, 2008; Suchman, 1995), consequently, by not actively deinstitutionalising (Maguire *et al*., 2002; Jepperson, 1991) and decoupling (Greenwood and Suddaby, 2006) from fossil fuels, its consumption remained the norm (Scott, 2001). This may have caused renewable energy adoption to be comparatively lower than that of fossil fuels (BEIS, 2016a), which may have in turn contributed to the partial institutionalisation of the renewable energy subfield (Jepperson, 1991).

Another factor which may have contributed to the renewable energy subfield only achieving partial institutionalisation is some structuring organisations having not being fully institutionalised themselves. As the findings of the archival study shows, some state agencies that had been vested with the responsibility of structuring the renewable energy subfield (e.g. DECC) did not acquire the status of being institutionalised (Lawrence and Suddaby, 2005). For example, DECC was dissolved in July 2016 after operating for only six years (see Table 10). As established by the literature review, institutionalised entities are capable of bringing order, stability and survivability to organisational settings (Scott, 2014; Meyer and Rowan, 1977, DiMaggio, 1988). This suggests that had these state departments acquired the status of being institutionalised, they may have served as powerful normative institutions to facilitate the renewable energy subfield transcending to the status of being fully institutionalised (Scott, 2014; Hoffman, 1999). Having said that, there is evidence of the renewable energy subfield being institutionalised to a certain extent through a multi-actor brand of institutional entrepreneurship.

[26] Conformance: behaving according to socially accepted norms and conventions.

6.3. 2 A Multi-Actor Brand of Institutional Entrepreneurship

This subsection draws on the lead of DiMaggio (1988) to discuss how the process of institutional entrepreneurship unfolded during the period. As the process model shows, the process of institutional entrepreneurship occurred as a result of different groups of actors enacting divergent institutional changes (Battilana, 2007). Collectively, these institutional entrepreneurs shaped the renewable subfield field by practising a brand of institutional entrepreneurship referred to by this thesis as multi-actor institutional entrepreneurship. In this particular case, multi-actor institutional entrepreneurship involved actors creating or transforming the different categories of institutions identified in Table 13: the regulative institutions being created or transformed by the state and its agencies, the EU and the UN; the normative institutions typically by field actors such as renewable energy practitioners and the incumbent energy providers; and the cultural-cognitive institutions being created or transformed by civil society and technocrats. This finding corroborates Scott's (2001) three-pillar model, which proposes that in organisational fields, the regulative institutions are generally created by regulatory organisations such as the state; normative institutions by industry sector and cultural-cognitive institutions by society at large. It however differs from the individualistic brand of institutional entrepreneurship often portrayed in the literature (e.g. Mutch, 2007; Leca and Nacchache, 2006).

One commonly held thesis on the process of institutional entrepreneurship is that actors operate singularly and reflexively to enact institutional change (e.g. Mutch, 2007; Greenwood and Suddaby, 2006; Leca and Naccache, 2006). This thesis tells a different story by showing that in the UK renewable energy subfield, institutional entrepreneurship was the outcome of multiple actors, negotiating an agreed outcome. As the process model shows, initially institutional entrepreneurship was triggered when the UK had to comply with environmental protection directives handed down by the EU (e.g. Large Combustion Plant Directive). The EU argued that greenhouse gas emitters, such as coal-fired power stations, had to be stringently monitored. After much negotiations, the UK Government launched the NFFO, probably out of obligation of being a member state. Realising that it would be more morally and ethically acceptable to use an independent body to oversee the process, the state appointed Ofgem for the role. This had the effect of creating and strengthening normative institutions in the field of energy provision (Scott, 2001). At the same time, grassroots activists sided with first-mover renewable energy practitioners to try and create a "pure green"

renewable energy subfield and started theorising (Greenwood *et al.,* 2002) that coal was a dirty technology that needed to be deinstitutionalised (Dacin and Dacin, 2008). From the perspective of institutional entrepreneurship theory, this type of coalition is a case of "mobilising bandwagon" to achieve a common interest (DiMaggio, 1988). A shared-system of meaning so to speak (Scott, 2014).

As the archival study shows, in 2005 the EU launched the EU ETS, the world's first greenhouse gas emissions trading scheme (European Commission, 2019). This was aimed at sanctioning emitters of greenhouse gases. In response to this regulative institution (Scott, 2001), the UK government launched its own regulative institution, ROCs, to replace the NFFO, in an obligated but negotiated way. Again, for moral and ethical reasons, the state vested (Lawrence and Suddaby, 2006) Ofgem with the responsibility of administering the ROCs, which had the effect of strengthening the normative and cultural-cognitive dimensions (Scott, 2001). To further underpin these institutions, the Energy Savings Trust, a not-for-profit organisation funded by the UK government and the private sector, launched the Low Carbon Building Programme as a grant for installing domestic microgeneration technologies. Not only did this increase the uptake of small-scale renewable energy, it also helped to professionalise the renewable energy subfield, thus strengthening its normative base (Scott, 2001). In that same year (2006), the Renewable Energy Association (REA) launched RECC as a set of quality assurance standards for the selling of small-scale heat and power generators from renewable energy sources. Again, this had the effect of further professionalising the subfield (Greenwood and Suddaby, 2006), thus creating a new set of normative institutions (Scott, 2001).

A pivotal point in the shaping of the renewable energy subfield was 2008, as the EU's Climate Change Act 2008 was launched that year to obligate member states to establish their own mechanisms for meeting a set target for renewable energy deployment by 2020. In response, the UK government launched the UK Renewable Energy Directive in 2009, a regulative institution (Scott, 2001) that triggered a new wave of institutional entrepreneurship in the renewable energy subfield (DiMaggio, 1988). From the perspective of institutional entrepreneurship theory, this suggests that the 2009 UK Renewable Energy Directive became an important driver for building consensus about how the UK should meet its 2020 renewable energy target of 15% of final energy consumed from renewable energy (Cabinet Office, 2009). To this end, DECC was formed and entered into the fold as a "renewable energy champion", using

the 2020 target as a shared-goal to coerce the take-up of renewable energy. DECC and other state bodies such as Ofgem used incentive structures such as the FITs and the RHI to accelerate the deployment of renewable energy. Initially, the FIT was so successful that in its first year there were 30,201 installations, generating some 68,559.4 MWh of electricity (Ofgem, 2011), however, this also attracted opportunists to the renewable energy field.

As this thesis has shown, the uptake of renewable energy might have increased too rapidly due to the attractiveness of the FITs, consequently, DECC modified the scheme to constrain its growth. This was particularly so after the introduction of the second wave of austerity measures in 2013. This had the binary effect of stymying the growth of renewable energy and deterring new entrants from entering the renewable energy subfield. "Decimated" the subfield, as one informant put it. In response, renewable energy practitioners bandied together to try and negotiate a better subsidy rate, because as they saw it, this mechanism was necessary for supporting renewable energy until it was able to stand on its own two feet. From the perspective of institutional theory, attain the status of being institutionalised (Dacin and Dacin, 2008; Jepperson, 1991; Meyer and Rowan, 1977). According to one renewable energy practitioner, they did not negotiate as individuals because they realised that individually they were too weak to achieve any meaningful outcome, so they negotiated collectively through organisations such as the Solar Trade Association (STA) and the Renewable Energy Association (REA). To make matters worse, there were push-backs from actors such as the DNOs who made it difficult for renewable energy practitioners to connect to the grid. Some informants also said that some incumbent energy providers had tried to manipulate power by lobbying the state to maintain the dominant institutional logic that the UK should provide its energy from fossil fuels and nuclear. In spite of this, the archival study shows that there was a steady, but gradual uptake of renewable energy through to end of the study period, along with divergent changes such as coal almost being fully deinstitutionalised (Dacin and Dacin, 2008; Battilana, 2007). Such divergent changes, and evidence of these groups of actors being responsible for their creation and implementation suggest that some form of institutional entrepreneurship had taken place. Based on the analysis of the collated data, the type of institutional entrepreneurship which took place was a form of multi-actor institutional entrepreneurship, since multiple actors practised as institutional entrepreneurs due to the complex configuration of the field of energy

provision (Wooten and Hoffman, 2008; Dacin *et al.*, 2002). As the foregoing story has told however, it was not simply a case of one group of actors imposing their institutions on others, but rather a case of different actors, from various social groups, working for negotiated and divergent changes in the field of energy provision. By so doing, some claimed the right of being classified as institutional entrepreneurs.

6.3.3 Agents of Divergent Institutional Change

This subsection discusses the actors who practised as institutional entrepreneurs during the period. As the process model shows, five groups of actors practised as institutional entrepreneurs: (1) the state and its agencies such as DECC, Ofgem the Environment Agency; *inter alia*; (2) renewable energy practitioners such as pure-play renewable energy firms, grass-root activists, amongst others; (3) incumbent energy practitioners such as the Big 6; operators of conventional power plants, multi-nationals with stakes in fossil fuels; etc.; (4) the European Union (EU); and (5) the United Nations (UN). These actors met the criteria for being institutional entrepreneurs by virtue of having initiated and implemented divergent institutional changes.

If the findings of the empirical research were to be taken at face value, the main institutional entrepreneur would be DECC, as this organisation had institutionalised most of the divergent institutional changes in the renewable energy subfield during the period. On the other hand, should the findings of the archival research be considered on their own, the main institutional entrepreneur would have been the state, for the same reasons. The most likely cause of the variation in the findings is the difference between the sources of the data. Although the informants frequently referred to the UK government during the interviews, generally they cited DECC as being the main protagonist. Institutional entrepreneurship theory provides a plausible explanation for this. According to DiMaggio and Powell's (1983) theory, organisational fields are recognisable areas of social life where actors interact fatefully with each other. This suggests that the respondents referred to DECC more so than any other actor because they were more fatefully affected by this organisation than any other. On the other hand, the archival research told a different story because the documents interrogated (policy documents; ONS record; etc.) provided a more objective account of the actors who had institutionalised the divergent institutional changes. The preceding section that collated and analysed the findings paints a more complete picture of what was really took place.

As the preceding section demonstrates, although the state and its various agencies (e.g. DECC; Ofgem; etc.) institutionalised many of the regulative institutions (Scott, 2001), it could be argued that this was to comply with EU directives due to the UK being a member state. Looking even further beyond, it could also be argued that the EU institutionalised regulative institutions such as the directive on Electricity Production from Renewable Energy Sources 2001/77/EC to comply with international treaties such as the UNFCCC because of the obligation of complying with international laws. It therefore seems that in complex organisational fields such as the field of energy provision in the UK, there is some sort of hierarchical relationship in which actors become institutional entrepreneurs out of obligation and their social positions (Greenwood and Suddaby, 2006). That aside, the findings suggest these actors practised as institutional entrepreneurs by having envisioned and implemented divergent institutional changes (Battilana, 2007; DiMaggio, 1988).

Despite practising as institutional entrepreneurs (DiMaggio, 1988; DiMaggio and Powell, 1983), these actors had divergent goals: The state promoted natural gas, nuclear and offshore wind for the UK's future energy provision; incumbents- mainly fossil fuels and the EU; UN and renewable energy practitioners- renewable energy. The findings also show that there were divergent renewable energy goals across UK member countries because some aspects of renewable energy policy had been devolved (Cabinet Office, 2002). These disparate goals may have limited field-level institutional change because institutional entrepreneurship is largely a collective strategy (Hardy and Maguire, 2008; Scott, 2001; DiMaggio, 1988).

Interestingly, this thesis has shown that some of the motivations for acting as institutional entrepreneurs in these organisational spheres differ from those of some commonly held theses. Contrary to the widely held view that elite actors are least likely to envision institutional change because they are privileged by existing institutional arrangements (Hardy and Maguire, 2008; Greenwood and Suddaby, 2006), this thesis found that these central agents readily initiated institutional change because it was within their best interests to do so. Similarly, although it is commonly proposed that peripheral actors are most likely to enact institutional change (Greenwood *et al.*, 2002), this thesis found that some renewable energy practitioners were unable to successfully enact institutional change because their agentic power was low (Fligstein, 2001). Having said that, this thesis found that some peripheral actors

practised as institutional entrepreneurs by ushering in a host of institutional changes (DiMaggio, 1988).

Of course one may take the alternative view that these actors did not practise as institutional entrepreneurs at all. One may choose to accept the antithesis that these actors were pre-existed by their social settings and the institutional changes were ushered in by a tide of market forces (Weik, 2011; Durkheim, 1964). As the findings show, the five groups of institutional entrepreneurs enacted divergent institutional changes such as introducing national renewable energy targets in the case of the state; innovative biomass plants in the case of incumbents and new renewable energy professions in the case of renewable energy practitioners. On the other hand, one might argue that the nuclear subfield has been equally instrumental in reshaping the field of energy provision therefore actors belonging to this community should equally qualify as institutional entrepreneurs. Although that may be the case, this relates to a thesis on low-carbon technologies or the nuclear subfield as community of the field of energy provision (Battilana, 2007). For this reason, it is being proposed that the alternative institutional logic must be explicitly stated for accuracy of determination and practical application in any institutional change project. Another compelling argument which supports the institutional entrepreneurship thesis is the finding that many of the new institutions were created by the institutional entrepreneurs, so logically they were not pre-existed by them. Based on the findings, it could also be reasonably argued that the special attributes of some actors enabled them to practise as institutional entrepreneurs.

6.3.4 Attributes of Institutional Entrepreneurs

This subsection considers the special qualities, abilities and characteristics which distinguished the institutional entrepreneurs from others in the renewable energy subfield and its overarching field of energy provision. According to the empirical element of the thesis, the four main attributes of an institutional entrepreneur are: perseverant (incorporating resilient); the ability to mobilise others; persuasive; and having good management skills. Except for the ability to mobilise others, this finding contrasts with the literature. For example, Mutch (2007) cited being reflexive as the main attribute in the case of Sir Andrew Barclay Walker; Fligstein (1997, 2001) identified being socially skilled and DiMaggio (1988) argued that being able to mobilise others, being charismatic and being resource-rich were essential features of being an institutional entrepreneur. One of the most probable reasons for the variation between the literature and the empirical findings is cognitive bias (Pannucci and

Wilkins, 2010). As argued previously, because organisational subfields shape the thoughts and behaviours of field constituents (DiMaggio, 1991), it is likely that the informants cited these attributes because they were influenced by their situational contexts[27] (DiMaggio and Powell, 1983). As DiMaggio (1988) emphasises, any account of institutional entrepreneurship must be at the organisational field-level, which suggests there must be a high level of abstraction. While not discounting the informants' views, the collated data tells us that some of the main attributes of institutional entrepreneurs in this context were being resource-rich (rich in social capital; human capital; financial capital; knowledge capital); skilful; powerful and the ability to motivate others. It is also likely that the attribute of being perseverant (incorporating resilient) is specific to the renewable energy subfield because returns on renewable energy investments tend to be slow, as some informants repeatedly pointed out. The revised list of attributes, based on the collated data, therefore tells a slightly different story.

As this thesis has shown, one of the most important attributes of being an institutional entrepreneur is the ability to mobilise others. For example, this characteristic was played out by some of the most successful renewable energy practitioners, who first mobilised financiers to provide financial backing for their institutionalisation projects and then used this newfound legitimacy (Suchman, 1995) to mobilise the public to come on board. This finding supports DiMaggio's (1988) conceptualisation of institutional entrepreneurs since he also proposed that this an essential requirement for gaining the support of others and the new routines being accepted. In a similar way, some of the institutional entrepreneurs were able to motivate others to support the institutionalisation of the renewable energy subfield. For example, DECC used mechanisms such as subsidies to motivate renewable energy practitioners and the public to engage in renewable energy projects. Again, this finding underpins DiMaggio (1988) thesis since this attribute involves motivating others to achieve and sustain the vision of institutionalising change. Overall, the collated data suggest that it was the collection of the different attributes which enabled some actors to practise as institutional entrepreneurs at the time.

As the literature review established, quite often single properties have been associated with those who practised as institutional entrepreneurs (e.g. Hardy and

[27] Situational contexts- The circumstance within an organisational field.

Maguire, 2008; Leca and Nacchache, 2006). This thesis however found that it was the collective stock of resources; skills, knowledge and experience (sometimes imported from other fields) which contributed to this being achieved. This suggests that possessing the right human capital enables some actors to practise as institutional entrepreneurs. This supports the view of DiMaggio (1998) that institutional entrepreneurs are active agents, whose personal traits dictate whether or not they practise as agents of field-level institutional change. Having said that, the findings suggest that the capacity of the institutional entrepreneurs to enact institutional change was tightly connected to power and the degree of agency they possessed.

As determined by archival study, the UN; EU and the state and its various agencies were the institutional entrepreneurs who created the regulative institutions. This suggests that in organisational fields regulatory organisations such as these are likely to be the creators of the regulative institutions. Similarly, the normative institutions, such as new business models, were created by the renewable energy practitioners, incumbents and other industry actors such as the REA and Gemserv. This creative organisational work might have contributed to shaping the field, however, the data suggest that stronger regulative instruments (e.g. FITs) may have undermined their effectiveness. This suggests that state power enabled civil authorities to control the degree of agency of the renewable energy practitioners, thus limiting their ability to shape the subfield. Similarly, incumbent energy providers exhibited the characteristic of being more powerful actors than the renewable energy practitioners because they occupied a more dominant subject position in the field of energy provision (Battilana *et al.*, 2009). This suggests that different forms of power were mobilised by the different institutional entrepreneurs to shape the renewable energy subfield (Lawrence, 2008).

As the findings suggest, two categories of power were exercised: episodic (influencing tactics) and systemic (agenda setting). State agencies engaged in agenda-setting and exercised coercive power through regulations (Scott, 2001), whereas the renewable energy practitioners and incumbent energy providers exercised normative influencing tactics (Powell and DiMaggio, 1983). This is important because agenda setting obligates actors to comply with regulatory instruments by law, unlike influencing tactics which are voluntarily complied with through social obligation (Fligstein, 2001). This claim is supported by the findings which show that during the period, consecutive governments engaged in agenda setting about how the UK should

provide its energy. For example, renewable energy was heavily promoted by the state at end of the noughties, however, this support was withdrawn after the second wave of austerity measures in 2013. The implication of this is that agenda-setting functioned as a powerful form of institutional control which dictated how things should have been done within the renewable energy subfield and the field of energy provision (Lawrence, 2008). This is not unusual, since Walker *et al.* (2014) found this to be the case in the solar energy sub-community in Canada, while Jolly and Raven (2015) observed likewise in the Indian wind energy sub-community.

Another important discovery was the relationship between operational time in an organisational field and the motivation for acting as institutional entrepreneurs. One commonly held thesis on the attributes of institutional entrepreneurs is that they are reflexive actors who act as institutional entrepreneurs to escape constraints such as conflicts within organisational fields (Leca and Naccache, 2006). Citing the work of Mutch's (2007), Hardy and Maguire (2008) use the case of Sir Andrew Barclay Walker as an example of this, explaining that he was able to act as an institutional entrepreneur because of his reflexivity. While this thesis supports that claim insofar as this factor being applicable to mature actors in mature fields, it differs by showing that new entrants to fledgling organisational subfields are more likely to act as institutional entrepreneurs for opportunistic reasons. This is because new entrants to fledgling organisational subfields are more likely to be motivated by factors such as the availability of opportunities (due to the newness of the field), and/or, events such as exogenous shocks and jolts. On the basis of DiMaggio's (1988) opportunistic conceptualisation of institutional entrepreneurs, it is therefore being proposed that in fledgling organisational subfields embedded within more mature fields, new field entrants are likely to be opportunistic institutional entrepreneurs, while the more mature actors are likely to be reflexive institutional entrepreneurs (Leca and Naccache, 2006). With the foregoing discussion in mind, this section closes by summing up some of the more salient points.

6.3.5 Summary

This section has synthesised and discussed the findings in relation to the first research question. It has shown that the renewable energy subfield in the UK became only partially institutionalised during the period and discussed the implications of this. Here, it was demonstrated that due to being partially institutionalised, the renewable energy subfield had the main characteristics of being malleable; unorganised and

unstructured. The five likely causes of the renewable energy subfield being partially institutionalised are: (1) the misalignment of its institutions; (2) its embeddedness; (3) the porosity of its borders; (4) the conformance of renewable energy practitioners; and (5) its structuring organisations not being institutionalised. Notably, within this section, the thesis proposed the idea of a subfield- an organisational sphere constrained by "subordinacy", as it is embedded within an overarching field which has a more dominant institutional logic.

The section next demonstrated that a multi-actor brand of institutional entrepreneurship was practised by the institutional entrepreneurs. Here, it has shown that this involved different groups of actors creating the various institutions: the regulative institutions were created or transformed by the state and its agencies, the EU and the UN; the normative institutions typically being created by renewable energy practitioners, the incumbent energy providers and other field actors; and the cultural-cognitive institutions were generally created by civil society and technocrats. It was however demonstrated that this was not simply a case of one group of actors imposing their institutions on others, but rather a case of different actors working for negotiated outcomes. Relatedly, the section identified and discussed the five main institutional entrepreneurs, these being: the UN; the EU; the state and its various agencies such as Ofgem and DECC; renewable energy practitioners/grass-root activists and incumbent energy providers. Before concluding, the section argued that the main attribute they possessed which enabled them to practise as institutional entrepreneurs were the collective stock of resources (social capital; human capital; financial capital); skills, knowledge and experience. Having discussed the findings related to research question 1, the next section discusses those associated with the second research question.

6. 4 MOTIVATORS AND INHIBITORS OF FIELD-LEVEL, DIVERGENT INSTITUTIONAL CHANGE

This section sheds light on the motivators and inhibitors of institutional entrepreneurship by answering the second research question: *"What conditions may have facilitated or hindered the shaping of the renewable energy subfield in the UK during the period 1986-2016?"* Having conducted the inquiry, three broad categories of enabling conditions were identified: (1) field-level conditions; (2) actors' social positions (both previously described by other scholars) and (3) institutionalised structural myths (a new category being proposed by this thesis). Another salient

finding was that instead of serving as enablers of institutional change, some field conditions served as institutional inhibitors, therefore each factor is now unpacked.

6.4.1 Triggers of Institutional Entrepreneurship

This subsection discusses the factors which either triggered or deterred institutional entrepreneurship during the study period. Enabling conditions are important antecedents to the process of institutional entrepreneurship because they facilitate the creation of the rules needed to support institutions, continue institutional routines and ensure institutional survival (Lawrence and Suddaby, 2006). Two categories of enabling conditions are frequently referred to in the literature, field-level conditions (Greenwood *et al*., 2002; Fligstein, 1997) and actors' social positions (Battilana *et al*., 2009; Emirbayer, 1997). This thesis underpins that thesis by also identifying field-level conditions and actors' social positions as the initial triggers of institutional entrepreneurship in the field of energy provision in the UK during the period 1986-2016. It however adds to that story by identifying institutionalised structural myths as another category of enabling conditions which either motivated or demotivated actors from reshaping that organisational setting. This lattermost factor is dealt with in the next subsection.

As the findings show, one of the field-level conditions which triggered institutional entrepreneurship during the period was instability in the field of energy provision. As a reminder, instability manifested in the form of the liberalisation of the energy market (1986- 1996); a period of environmental protection (1988-2008); and the introduction of the UK Renewable Energy Directive 2009/28/EC in 2009. This finding corroborates that of Greenwood and Suddaby (2006) who also found that instability within organisational fields tends to be one of the main catalysts of institutional entrepreneurship. Instability tends to trigger institutional entrepreneurship because actors seek to overcome this endogenous constraint (Battilana *et al.*, 2009) by changing existing institutional arrangements in the field (DiMaggio, 1988).

Another field-level condition which might have triggered institutional entrepreneurship was the ontological status of the fields. In this context, ontological status means the state of the renewable energy subfield and the field of energy provision at the time. One of the salient findings of this thesis was that although the field of energy provision was replete with opportunities, it was also a highly political space. Throughout the findings there is evidence of the various actors in the field of energy provision negotiating the most appropriate way of providing the UK's energy.

Actors also jostled for resources, for example, incumbent energy providers using their financial capital and power to enter into the renewable energy subfield to capitalise on the opportunities therein. Not only did this lead to contestation for resources, it also caused contradictions in the field of energy provision (Seo and Creed, 2002). This may have led to the renewable energy subfield being a highly conflictual space (DiMaggio, 1988) as it was occupied by constituents with disparate goals (Greenwood and Suddaby, 2006). This lack of a shared system of meaning across the renewable energy subfield may have been one of the main triggers of institutional entrepreneurship (Fligstein, 2001) because some actors sought to pursue their own personal goals (DiMaggio, 1988). In sum, the findings suggest that ontologically the renewable energy subfields is a geographically unbounded, open relational network, socially constructed by its constituents. In this way, it has been constructed around common issues rather than a common market or technology, and this may have triggered institutional entrepreneurship since actors bandied together to try and overcome these constraints (DiMaggio, 1988).

Actors' social positions may have also triggered institutional entrepreneurship. As this thesis shows, the state was one of the first protagonists to practise as an institutional entrepreneur by creating new institutional arrangements within the field of energy provision to promote renewable energy- for example, launching the NFFO in 1990 (Defra, 2011). Similarly, the incumbent energy providers were able to enact institutional change within the field of energy provision because of their privileged position. To recall, some incumbent informants confided that they were well-connected to policymakers, consequently, they had been consulted in the past to contribute to shaping public energy policy. Further, incumbent energy providers were also able to readily capitalise on the opportunities in the renewable energy subfield because they had well-established pipelines and infrastructure. This finding supports Battilana *et al.*'s, (2009) thesis that actors' social position is an enabling condition that triggers institutional entrepreneurship.

6. 4.2 Institutionalised Structural Myths: Motivators or Demotivators of Institutional Entrepreneurship?

This subsection considers how deeply entrenched norms and beliefs may have either motivated or demotivated some actors from trying to change existing institutional arrangements in the field of energy provision. As established by the literature review, certainty in public policy can be a key enabling condition as it serves as a powerful

rational myth if it is institutionalised (Meyer and Rowan, 1977). An important finding of this thesis is that one of the main existential enabling conditions which motivated the renewable energy practitioners to act as institutional entrepreneurs was energy policy (un)certainty. As a reminder, there were divergent views on whether or not the state has created an environment of policy certainty for the renewable energy subfield. While respondents belonging to the wind energy segment believed that there had been policy certainty, those from other renewable energy segments perceived that this was not the case. This suggests that respondents' views were narrowly conceived and influenced by their situational context.

The findings show that public policy certainty, or uncertainty, can influence actors' decision-making process. This was attributed to the lack of recent energy policies which made some investors reluctant to invest in renewable energy. As the archival study shows, current national energy policy is based on the 2007; 2009 and 2011 energy white papers (DECC, 2011b). This suggests that there were no templates to serve as guides for planning purposes (Scott, 2001). This uncertainty is likely to have constrained behaviour in the subfield because as Scott (2003) explains, for ideas to be successfully moved from place to place, they must be communicated in a form suitable for transmission and then decoded by recipients embedded in different situations. This suggests that had there been an institutionalised energy White Paper that mapped the direction of the renewable energy subfield, this might have created an atmosphere of policy certainty to motivate actors such as investors investing in renewable energy (Meyer and Rowan, 1977; DiMaggio and Powell, 1983). Such deeply entrenched beliefs may be regarded as institutionalised structural myths[28] (Meyer and Rowan, 1977).

Institutionalised structural myths may have served as enabling conditions for institutional entrepreneurship in the field of energy provision because they both motivated and demotivated players from acting. By this it is meant that entrenched, cultured *"structures"*, such as the belief that fossil fuels and nuclear should be the main sources of energy in the UK, had caused field constituents to act ceremonially (Meyer and Rowan, 1977). For example, as the findings show, participants pointed to an "*atmosphere*" of energy policy uncertainty and explained that they were reluctant to engage in entrepreneurial activities because of this. It may therefore be plausibly

[28] Structural myths: The human emotions which influence sense and decision making

proposed, that institutionalised structural myths are enabling conditions which serve as cognitive maps to influence the decision-making process (Geertz, 1973). This proposal is supported by the recent pronouncement that coal was not used for national electricity provision for an entire working day on 21st April 2017 (National Grid, 2017) because carbon tax had served as a powerful structural myth due to the NFFO being an institutionalised policy instrument (Meyer and Rowan, 1977).

The suggestion that institutionalised structural myths also served as enabling conditions supports DiMaggio's (1991) theory that actors shape and are reciprocally shaped by their organisational fields. By so doing, it rejects the idea of pure isomorphism (DiMaggio and Powell, 1983) and the deterministic position that only one course of action is possible or that the future is entirely determined by past events (Bhaskar, 1989). In this particular case, institutionalised structural myths may be regarded as having been more influential than field-level conditions and at least equal to actors' social positions as an enabling condition for motivating and demotivating actors from practising as institutional entrepreneurs in the renewable energy subfield. For example, although field-level characteristics (such as renewable energy being a disruptive technology) existed to motivate actors to act as institutional entrepreneurs, they failed to do so because of the lack of a supportive renewable energy policy framework. Notwithstanding this view, some structures in both the renewable energy subfield and the field of energy provision served as institutional enablers for field-level institutional change.

6.4.3 Institutional Enablers of Field-level Institutional Change

This subsection discusses the mechanisms which may have supported renewable energy or the renewable energy subfield during the period. As established by the literature review, state incentive schemes may have served as crucial institutional enablers by supporting the institutionalisation of renewable energy during the period. This thesis has however shown that in the case of the renewable energy subfield in the UK, some state incentive schemes such as the FITs had been poorly designed and managed, consequently they did not endure, or, were not sufficiently supportive to assist renewable energy getting to the stage of being institutionalised. The likely reason for this was the variation in the attractiveness of incentive schemes at different periods. As the archival study shows, at its launch in 2010 the FITs rates were set at 41p/kWh for small-scale PV installations. This resulted in a marked uptick of renewable energy adoption and encourage new entrants to enter into the renewable energy subfield

(Ofgem, 2011). In stark contrast, when the FITs rates were reduced to 4.41p/kWh in 2016 (Ofgem, 2016), many renewable energy practitioners exited the renewable energy subfield and the deployment rate of renewable energy fell sharply. Jolly and Raven (2015) and Walker *et al.* (2014) noted a similar effect in their studies. In the case of the UK, this finding suggests that state incentives such as the feed-in tariff were too pragmatic; inappropriately modelled and insufficiently supported normatively and cognitively. This suggests that incentive schemes should be designed to be well-balanced; deter free-riding (Wijen and Ansari, 2007) and minimised or gradually withdrawn until the technology gets to the stage of being institutionalised. This is because once it gets to that stage, the technology is likely to be adopted ceremoniously (Meyer and Rowan, 1977); without thought and diffuse pervasively (DiMaggio and Powell, 1983).

Towards the end of the study period, demand-side response and energy storage were proving to be key technological enablers. For example, energy storage was helping to deinstitutionalise (Jepperson, 1991) the deeply entrenched belief that renewable energy cannot be stored. By so doing, these institutional enablers had assisted in eroding some of the debilitating normative and cultural-cognitive institutions (Scott, 2001) surrounding renewable energy. The full extent to which these enabling technologies may assist renewable energy becoming fully institutionalised remains unexplored because they are still in their infancy, unlike inhibitors of field-level institutional change, a phenomenon which has already been widely investigated.

6.4.4 Inhibitors of Field-level Institutional Change

This, the final subsection, considers the mechanisms which may have prevented, or, contributed to preventing, field-level institutional change from taking place. As this thesis established, there were six main institutional constraints in the renewable energy subfield during the period: environmental concerns; poor grid infrastructure; poor credibility of the renewable energy subfield; financial constraints; sociological constraints and prevailing assumptions and beliefs about renewable energy. These constraints may either be grouped as endogenous drivers or exogenous shocks (Child *et al.,* 2007; Greenwood *et al.,* 2002). For example, environmental concerns may be categorised as an exogenous factor (Fligstein, 1997), whereas the poor credibility of renewable energy practitioners could be grouped as endogenous factors (Battilana *et al*., 2009; Emirbayer, 1997). This categorisation however provides little explanation as to why some of these factors may not have triggered institutional entrepreneurship

in this particular case. Grouping the constraints according to the institutional pillar upon which they are built, or, as formal and informal constraints, provides far more explanatory punch. Of these, environmental concerns; financial constraints and poor grid infrastructure are normative constraints, while the remainder are cognitive constraints. Grouping the constraints this way tells us that the normative constraints may have triggered institutional entrepreneurship if they were supported by regulative institutions. Likewise, cognitive constraints if they were supported by formal institutions (see Table 13 for categorisation). For example, new legislation stipulating that all new-builds should provide a certain amount of their energy from renewable energy sources to address the problem of grid constraint may have triggered a new wave of institutional entrepreneurship. Similarly, creating stronger normative institutions, such as more stringent vetting mechanisms, may have eroded cultural-cognitive institutions such as the poor credibility of the renewable energy subfield.

As established by the literature review, the potential effects of institutional constraints are dependent upon two main factors: field-level conditions and the structure/agency relationship of field-level actors (Walker *et al.,* 2014; Maguire *et al.,* 2004). Due to being a fledgling technological field, the renewable energy subfield offered considerable scope for institutional entrepreneurship because of the lack of institutionalised practices, fluid relationships and the absence of clearly identifiable norms (Hardy and Maguire, 2008). On the other hand, because the subfield resides within the more mature institutionalised field of energy provision, some of these potential enabling conditions might have been nullified. Consequently, constraints such as policy uncertainty and the UK being an oil-based economy may have been too challenging for some renewable energy practitioners to surmount. This may have limited the effects of some of these enabling conditions (Battilana, 2004).

Sociological factors, such as the institutional environments in which they were embedded may have hindered some actors from enacting institutional change (Palthe, 2014). As the literature review established, the central premise of institutional entrepreneurship theory is that it reintroduces actors' agency into institutional theory (Leca *et al.*, 2008) because actors make rational choices (DiMaggio and Powell, 1983). However, the choices are both enabled and constrained by who the actors are and by their institutional environment at the time of the choice (DiMaggio, 1988). The data however suggests that many of the actors, particularly the smaller renewable energy practitioners, were operating within the field of energy provision which had more

powerful established scripts (such as fossil fuels being the energy of choice because of its efficiency in meeting consumers' demands) than those they were proposing.

6.4.5 Summary

This section has attempted to answer the second research question by discussing the conditions which may have facilitated or hindered the shaping of the renewable energy subfield in the UK during the period 1986-2016. It has shown that three categories of enabling conditions motivated or demotivated actors from practising as institutional entrepreneurs at the time: field-level conditions; actors' social positions and institutionalised structural myths. During that discussion, it was argued that field-level conditions (i.e. the liberalisation of the energy market; a period of environment protection and the launch of the 2009 UK Renewable Energy Directive) and actors' social position (e.g. incumbents being central actors and renewable energy practitioners, peripheral) were the initial triggers of institutional entrepreneurship. It has also proposed that institutionalised structural myth is a third category of enabling conditions because they influenced action or inaction in both fields. For example, some actors deliberately decided not to invest in renewable energy because of policy uncertainty. The section has also shown that mechanisms such as state investment schemes served as institutional enabler as they had motivated some actors to participate in renewable energy ventures. Similarly, it was argued that emerging technologies, such as demand-side response and energy storage, were proving to be important institutional enablers because they had assisted in increasing the deployment of renewable energy. Before closing, the section discussed six institutional constraints which either motivated or demotivated players from acting during the period: environmental issues; poor grid infrastructure; poor credibility of the renewable energy subfield; financial constraints; sociological constraints and prevailing assumptions and beliefs about renewable energy. Having discussed the motivators and inhibitors of institutional change in this section, the next section answers the final research question by discussing how legitimacy might have been gained during the period.

6.5 GAINING LEGITIMACY IN THE FIELD OF ENERGY PROVISION IN THE UK

This section attempts to close the gap in knowledge on legitimacy by discussing the findings related to the third and final research question: "*How might have institutional*

entrepreneurs gained legitimacy for themselves and their activities and what effect may this have had on the renewable energy subfield gaining legitimacy?" Having conducted the inquiry, the thesis finds that the legitimacy of the institutional entrepreneurs was largely founded on the intervention strategies they deployed and renewable energy being a viable alternative to its fossil fuel counterparts. Insofar as the renewable energy subfield itself goes, complete legitimacy remained elusive, however, it did attain the status of being a partially legitimate organisational sphere. The factors which may have contributed to this are elaborated upon in the subsections that follow, along with a discussion on what the renewable energy subfield might have looked like had it gained complete legitimacy.

6.5.1 The Effect of Varying Degrees of Legitimacy on the Renewable Energy Subfield

This subsection considers the implications of renewable energy and the renewable energy subfield in the UK being only partially legitimate. As established by the literature review, Meyer and Scott (1983) define organisational legitimacy as the degree of cultural support for an organisation. Completely legitimate organisations are at the upper end of the spectrum because their existence is unquestionable and they are widely accepted (Suchman, 1995; Meyer and Scott, 1983). These organisations are likely to have high survival rates and disperse and reproduce widely (DiMaggio and Powell, 1983). They also have more freedom to pursue their activities unimpeded (Child, 1972) and are more likely to attract investments than their illegitimate counterparts (Zimmerman and Zeitz, 2002). At the other end of the scale, illegitimate organisations are entities which deviate from accepted rules or standards and have not gained acceptance for themselves or their organisational elements (Pfeffer and Salancik, 1978). Illegitimate entities are likely to have low survival rates because many questions can be asked about them and better alternatives presented (DiMaggio and Powell, 1983). They are also unlikely to self-reproduce or attract investments (Zimmerman and Zeitz, 2002). This thesis however provides evidence of a third degree of legitimacy- partial legitimacy, a situation in which some questions can still be asked and a few better alternatives presented.

For qualification, in this particular case legitimacy is viewed from the perspective of the informants of this thesis and society-at-large, because energy is a commodity intended for public consumption. It is measured in terms of the appropriateness of the relevant organisational entity in relation to energy provision in

the UK, through the lens of society-at-large and the respondents. As this thesis has shown, state departments and the overarching field of energy provision had the highest degree of legitimacy by virtue of state power and functional necessity respectively (Lawrence and Suddaby, 2005). The findings also suggest that the incumbents had a comparatively higher degree of legitimacy than the renewable energy practitioners because they were relied upon for energy provision in the UK; dominance (Maguire *et al*., 2004); reputation; status (Deephouse and Suchman, 2008) and the power of incumbency. Contrarily, towards the end of the study period the legitimacy of the renewable energy subfield had been compromised because of factors such as the unethical behaviour of renewable energy practitioners, job losses and the Northern Ireland green scandal (see chapters 4 and 5). Being partially legitimate is likely to have had the effects of reducing the competitiveness and survival rate of the renewable energy subfield (Pfeffer and Salancik, 1978). The findings also suggest that the legitimacy of the renewable energy subfield in the UK was fluid since it fluctuated during the study period and was not as statics as previous accounts of legitimacy. For instance, during the period of environmental protection (1988-2008), the renewable energy subfield and renewable energy had high levels of legitimacy because they were supported by the state and were perceived by the public as being solutions to environmental degradation. Although this led to the expansion of the renewable energy subfield after a number of regulative institutions (e.g. 2009 Renewable Energy Directive) had been created to support its growth, its legitimacy decreased when subsequent governments withdrew their support and/or other delegitimising factors such as the oversubscription of subsidies (Suchman, 1995). This finding is consistent with that of Markard *et al.*, (2016) who also found that legitimacy was a fluid property in their study, as in that particular situation, it had changed from being strong when biogas was seen as a solution to the problems in the field of agriculture in Germany, to weak when it supportive institutions were misaligned.

Relatedly, this thesis proposes that there is a direct relationship between the extent of legitimacy of an organisational entity and the degree to which it is institutionalised. For example, because the state and the field of energy provision were the most highly institutionalised entities, they had the highest degree of legitimacy. On the other hand, both the fossil fuels and renewable energy subfields were comparatively less legitimate because questions could still be asked about them. In this particular case, the fossil fuels subfield was more highly institutionalised than the

renewable energy subfield and therefore had a higher degree of legitimacy (Suchman, 1995). This thesis has also shown that a similar pattern of co-relationship existed with the institutional entrepreneurs in that the state was the most legitimate, followed by the incumbent energy providers, with the renewable energy practitioners being the least legitimate. As Suchman (1995) explains, the likely cause for this is a phenomenon referred to as "*sector-leader's paradox*", whereby an entire sector may be configured in the leader's image. In so doing, the sector may be shaped to attain the leader's goals (in this case that of state agencies such as DECC), rather than that of entire field (*ibid*, 1995, p.601). This is an important finding because it suggests that had the renewable energy subfield attained the status of being fully institutionalised, it is likely that it would have been closer to being fully legitimate (Suchman, 1995). The likely effect of this, is the renewable energy subfield having an enhanced survivability prospect (DiMaggio and Powell, 1983); a higher status (Deephouse and Suchman, 2008); be more widely accepted (Suchman, 1995; Meyer and Scott, 1983) and would have attracted more investments (Zimmerman and Zeitz, 2002). The data however suggest that a number of factors may have caused the renewable energy subfield and some of its organisational elements to be questionable.

As the findings suggest, the renewable energy subfield in the UK was only partially legitimate due to three main reasons. First, some prevailing institutions had caused renewable energy to be still questionable. For example, from a pragmatic standpoint, the high capital costs and efficiency of some renewable energy systems; from a normative perspective, the vulnerability of the RECC and from a cultural-cognitive angle, the poor credibility of the renewable energy subfield. This was exemplified by many renewable energy technologies being less efficient than their fossil fuel counterparts (except biomass and hydroelectricity), such as the variability of solar PV and the intermittency of wind power (see Chapter 4). Second, the disparate goals of the various actors in the renewable energy subfield may have also undermined its legitimacy (Suchman, 1995). For example, whereas the pre-incentive renewable energy practitioners might have sought to provide a better technological solution *for society* (cognitive legitimacy); the post-incentive renewable energy practitioners might have based their legitimacy on *what's in for me* (pragmatic legitimacy); state bodies might have based their legitimacy on *what's best for the UK?* -from its perspective (pragmatic legitimacy); while the incumbent energy providers might have based their legitimacy on *what's in it for our shareholders?* (Suchman, 1995; Scott, 1994).

Third, the basis on which legitimacy was founded might have had an effect on the level of commitment and choice of institutionalisation project initiated in the renewable energy subfield. Post-incentive renewable energy practitioners and the incumbents, whose legitimacy was founded on pragmatism, tended to have a low level of commitment. This might have caused some of these actors to abandon the subfield during unsurmountable crises. Paradoxically, although the incumbents were considered to be the "illegitimates" in the renewable energy subfield because of their involvement with fossil fuels (Deephouse and Suchman, 2008), they gained legitimacy on the basis of being the dominant players (Maguire *et al.*, 2004). This may have compromised the take-up of renewable energy because their basis of legitimacy hinged on satisfying the needs of their shareholders, therefore they may have prioritised the use of fossil fuels and nuclear for pragmatic reasons (Suchman, 1995). On a more positive note, the analysis suggests that offshore wind energy had gained more complete legitimacy than the other renewable energy sub-communities, primarily because of state support and other legitimating factors such as job creation and the absence of subversive cognitive institutions (e.g. being out of sight might have eroded cultural-cognitive institutions such as NIMBYism). It is therefore being proposed, that fledgling technological subfields which possess strong normative; regulative and cultural-cognitive institutions, are less questionable and therefore more likely to gain complete legitimacy (Meyer and Scott, 1983). This proposal is supported by the work of Markard *et al.*, (2016) who also found that the if the three institutional pillars are appropriately aligned, this is likely to impact positively on actors' decision making and strengthen the legitimacy of the organisational entity. Notwithstanding this view, the findings suggest that the manner in which some actors deployed their intervention strategies was a major determinant in their degree of legitimacy.

6.5.2 The Importance of Appropriate Strategy Deployment in Gaining Legitimacy

This subsection discusses the importance of actors using the appropriate intervention strategies when they are trying to gain legitimacy in an organisational field. Although the findings suggest that the majority of renewable energy practitioners had not gained complete legitimacy in the field of energy provision, those who had, had gained this on the basis of having deployed their intervention strategies appropriately. For example, one practitioner who had successfully used mainstreaming as an intervention strategy to increase the take-up of renewable energy, first collaborated with financiers

to obtain financial capital (Hardy and Maguire, 2008), and then used this new-found legitimacy (Suchman, 1995) to convince others to participate in his institutionalisation projects (Colomy, 1998). Conversely, the data show that practitioners who deployed their intervention strategies inappropriately failed to gain full legitimacy. For example, some renewable energy practitioners (e.g. the Solar Trade Association) did not provide compelling arguments as to why renewable energy should be adopted. This is a significant failing because as established by the literature review, effective theorisation involves first specifying a general organisational failing and then justifying a local innovation as a better solution (Greenwood *et al.*, 2002). This suggests that had these practitioners deployed their intervention strategies more appropriately, they may have been more successful in institutionalising renewable energy (Smink *et al.*, 2015; Greenwood *et al.*, 2002), subsequently increasing its legitimacy (Deephouse and Suchman, 2008; Suchman, 1995).

This thesis has shown that some incumbent energy practitioners who owned renewable energy assets and actors straddling both the oil and gas and renewables subfields, deliberately disengaged from theorisation work on the basis of wishing to remain neutral agents. This is notable because the central premise of institutional entrepreneurship is the role of actors' agency in enacting institutional change (DiMaggio, 1988). This suggests that inaction may have contributed to the renewable energy subfield being only partially legitimate. Caution is however applied to this notion because of the relatively small dataset used for this thesis. Notwithstanding this limitation, this thesis corroborates that of Wijen and Ansari (2007) who also found that inaction played a major role in some organisational entities not attaining complete legitimacy in their empirical setting.

This thesis supports Lawrence and Suddaby's (2005) scholarship that educating can be an effective intervention strategy for equipping actors with the knowledge and skills needed to support new institutions. Although this is particularly relevant for fledgling subfields that lack established norms and practices which serve as templates (Maguire *et al.*, 2004), this thesis found that there was the absence of the public being educated about the virtues of adopting renewable energy. This suggests that had educating been effectively deployed to facilitate mimicry and debunk subversive institutional myths, institutional change and complete legitimacy might have been more complete for the renewable energy subfield (Suchman, 1995).

It is well-documented in the literature that lobbying is a strategy commonly used by institutional entrepreneurs to shape their institutional context (Maguire *et al.*, 2004; Fligstein, 1997; Hoffman, 1999). This claim is corroborated by this thesis which shows that lobbying was one of the most commonly deployed intervention strategies. It also shows that the incumbent energy practitioners were better at lobbying because they were "well connected", had more resources and were more skilful in the practice. Conversely, the renewable energy practitioners were less proficient at lobbying. This may have limited their ability to enact institutional change (Leca *et al.*, 2008), subsequently increasing their legitimacy (Suchman, 1995). As the findings indicate, the renewable energy practitioners were poor at lobbying because they did not collaborate to create a collective action frame. This suggests that lobbying might have been a more effective intervention strategy had the renewable energy practitioners collaborated and presented a detailed plan about why renewable energy is a better alternative than its fossil fuel counterparts (Hardy and Maguire, 2008). Although it is recognised that generally the renewable energy practitioners had comparatively less financial capital than incumbent energy providers, had they collaborated more, their collective voice (a common action frame) would have been stronger, thus increasing their legitimacy (Deephouse and Suchman, 2008; Suchman, 1995).

This thesis has shown that some pure-play renewable energy practitioners were successful with their renewable energy ventures by engaging in boundary bridging activities. To recall, one renewable energy practitioner had explained that he had formed an alliance with someone from the wastewater and food industry to develop a bioenergy scheme. This finding contrasts with the existing scholarship on boundary bridging which holds that "elite, central organisations are more likely to come into contact with contradictory logics because they bridge organisational fields" (Greenwood and Suddaby, 2006, p.27). In this particular case, renewable energy practitioners were more likely to be exposed to and capitalise on opportunities in other organisational fields (DiMaggio, 1991) because they were disadvantaged by their existing social position (Battilana *et al.*, 2009) On the other hand, this thesis corroborates the existing boundary bridging scholarship which holds that networks serve as vehicles through which norms are diffused, thus causing a convergence around common practices (Greenwood and Suddaby, 2006). The theory being put forward by this thesis is that location in organisational fields does not affect boundary bridging significantly, in that both central and peripheral actors will act

entrepreneurially due to being equally aware of, and open to, alternative arrangements in other fields (*ibid*, 2006, p.42).

As the findings show, one of the intervention strategies that was appropriately deployed was normalising. In this regard, some informants explained that they had managed to succeed with their institutionalisation project by purposively scaling-up their renewable energy venture. It was however determined that this strategy only applied to the few institutional entrepreneurs who had sufficient financial resources to employ this strategy. Nevertheless, this thesis found sufficient evidence to propose that normalising may be an effective strategic intervention for enabling institutional change and increasing legitimacy (Deephouse and Suchman, 2005; Suchman, 1995). This is because normalising is an effective way of escaping institutional constraints, for example, once a new technology grows above one per cent of global sales, it is no longer considered to be a niche product and becomes virtually impossible to annihilate (Christensen, 1997). Being normalised also assist organisational entities with decoupling from some of the negative cognitive institutions associated with being "new" (Scott, 2014). Had the renewable energy subfield been more legitimate, it is more likely that the respondents would have realised their vision of a "new energy system" in the UK, in the not so distant future.

6.5.3 Vision of a New Energy System in the UK

This subsection discusses what the informants regard as the ideal way for the UK to provide its energy. As the findings show, informants persistently appealed for a "new energy system" in the UK. As a reminder, their vision suggests that the "new energy system" would comprise seven main technologies: wind energy; solar photovoltaic; wave energy; tidal energy; biogas; biomass and hydro. This vision is supported by the analysis of archival documents which shows that the renewable energy technologies being targeted for large-scale deployment are wind, solar and hydro energy; bioenergy (energy from combustion of plant and animal matter; waste energy, such as landfill gas, and aerothermal, geothermal and hydrothermal energy (heat from the air, ground and water, respectively) (Parliament UK, 2019).

According to the practical element of the thesis, fossil fuels are very polluting, therefore informants envisioned a less polluted society facilitated by the wide-scale deployment of renewable energy. This notion is supported by the analysis of archival documents which shows that the transportation sector is currently the largest consumer of energy in the UK (BEIS, 2016a). This thesis confirms that increasing the use of

renewable energy in the transportation sector is more sustainable because it is a less polluting technology. However, it conceded that supplanting fossil fuels for transportation might be challenging because fossil fuel usage is highly institutionalised and supported by a well-developed infrastructure. This constraint may be overcome by integrating electric vehicles with renewable energy systems, thus strengthening the pragmatic legitimacy of renewable energy (Deephouse and Suchman, 2008; Suchman, 1995).

As the findings show, informant consistently referred to Germany's *Energiewende* model as being the ideal. Renewable energy practitioners and incumbent energy providers alike pointed out that this model had transformed Germany's energy regime through the introduction of a new policy direction in 2010. This indicates that should informants' visions be realised, it is likely that the new energy system in the UK will be enabled by a new policy direction because the *Energiewende* encouraged a shift from centralised to distributed power generation. Achieving this vision is not unrealistic since institutional theory holds that mimicry is an effective way of responding to organisational constraints by copying existing templates in organisational fields (DiMaggio, 1991; DiMaggio and Powell, 1983).

Of course, the importance of the hydrocarbons sector as part of the new policy landscape cannot be ignored. As the archival study shows, in 2015 the oil and gas industry provided seventy per cent of the total primary energy consumed in the UK, supported around 333,000 jobs with an average annual salary of approximately £64,000 and added around £35 billion to the UK's economy (The UK Oil and Gas Industry Association, 2016). As drawn out by this thesis, the UK's economy is so intertwined with the oil and gas industry that low oil prices in 2015-2016 had a direct impact on the domestic stock market and caused renewable energy to be less attractive. As the abovementioned figures show, the hydrocarbons sector is of such importance to the UK's socio-economic landscape, that a weaning approach might be best for transitioning from the old to the "new energy system". In such a situation, the renewable energy subfield might increase its legitimacy by plugging the gap left by the hydrocarbons (Deephouse and Suchman, 2008; Suchman, 1995). As this thesis has shown however, this is unlikely to be an easy feat due to inertial drag[29].

[29] Inertial drag- Factors preventing institutional change.

6.5.4 The Effect of Inertial Drag on Institutional Change

This subsection discusses some of the main factors which may have caused some of the existing institutional arrangements to remain unchanged in the field of energy provision. Resistance to institutional change is well-documented in institutional entrepreneurship literature. This is because powerful actors tend to try and maintain the *status quo* as it is in their best interest to do so (Sarasini, 2013; Lawrence, 2008; Lawrence and Suddaby, 2005). As the finding shows, resistance to change may have contributed to the renewable energy subfield achieving only partial legitimacy. This was attributed to tactics being used by state bodies; incumbent energy practitioners and the DNOs[30] to maintain the *status quo*. From an institutional theory perspective, these were deterring strategies employed by these actors to maintain field-level rules, norms and beliefs (DiMaggio and Powell, 1983). For example, state incentive schemes being amended to temper the growth of renewables when they became oversubscribed (DECC, 2015a). The consequence of this was that these resistance strategies had the effect of limiting actors' agency within the field, especially that of the renewable energy practitioners.

Surprisingly, although the incumbent energy practitioners engaged in some form of resistance work this was mainly through lobbying and not actively promoting renewable energy. One potential explanation for this was that some incumbent energy providers had considerable renewable energy assets. This is consistent with the findings of Smink *et al.* (2015) who also found that the incumbents were the main institutional entrepreneurs in the Dutch bio-methane sector. Nevertheless, this is a surprising discovery because it might have been assumed that this may have threatened the incumbents' business model of providing the UK's energy by fossil fuel and nuclear technologies. Having said that, the findings suggest that the main reason why the renewable energy practitioners failed to overcome this constraint might have been their comparatively lesser-degree of agency.

Another important finding was that some renewable energy practitioners escaped the paradox of being embedded agents while others remained afflicted. Generally, it was felt that the state agencies and incumbent energy practitioners were not significantly afflicted because of state power and the power of incumbency respectively. Interestingly, one institutional entrepreneur who had initiated one of the

[30] DNOs: District Network Operators

most impactful renewable energy ventures (conversion of one the UK's largest power plants from coal to biomass) did not focus on changing the dominant institutional logic. Instead, this organisation changed the individual rules necessary for realising its institutional change project. "Piggybacking", so to speak. This is consistent with Seo and Creed's (2002) dialectical model which proposes that institutional contradictions cause institutional entrepreneurs to emerge. This suggests that the process of institutional entrepreneurship is an episodic, incremental and ongoing process, and not nearly as radical as often documented.

This thesis has shown that innovating might also be an effective strategy for escaping the constraint of being an embedded agent. As the data show, while the renewable energy practitioners primarily innovated through professionalisation and theorisation (Greenwood *et al.,* 2002), the incumbents and actors straddling both fields[31] typically innovated technologically (e.g. developing larger, more efficient wind turbines because they possessed the necessary resources). This suggests that whereas the incumbents and multi-play actors had pragmatically escaped the paradox, renewable energy practitioners did so normatively. On the other hand, because the renewable energy practitioners did not innovatively dislodge the subversive cultural-cognitive institutions (i.e. negative beliefs and assumptions about renewable energy) it undermined the legitimacy of renewable energy. This corroborates Walker *et al.'s* (2014) thesis that innovation is one of the most effective strategies for gaining legitimacy in fledgling technological fields.

In addition to the strategy discussed above, this thesis has shown that a number of delegitimising factors also contributed to the renewable energy subfield being only partially legitimate. These include, but are not limited to, the poor credibility of the renewables subfield; the high membership costs of some trade organisations; job losses; the botched Renewable Heat Incentive scheme in Northern Ireland (Cash for Ash scandal); and prevailing myths and assumptions about renewable energy. Viewed through the lens of institutional theory, these factors may have eroded the cultural support needed to transmute the renewable energy subfield to the state of being completely legitimate (Scott, 2014). In other words, these factors translated to delegitimising questions (Deephouse and Suchman, 2008; Meyer and Scott, 1983) being posed about renewable energy and the renewable energy subfield. This supports

[31] Oil and gas and renewables subfields

Walker *et al.,* (2014) finding that such delegitimising factors had contributed to undermining the solar energy sub-community in Canada. In organisational analysis, it is however important that behind the curtain institutional explanations are explored rather than "running away" with front stage explanations (Greenwood *et al*., 2008). Given this, the thesis now investigates if the manner in which the institutions were conveyed may have played a part in this.

6.5.5 The Effect of the Mode of Transmutation in Gaining Legitimacy

The vehicles used to try and transmute the institutional ideas to the state of being institutionalised may have also contributed to the renewable energy subfield only achieving partial legitimacy. As the findings show, four types of carriers were used to transport the ideas: symbolic systems; relational systems; routines and artefacts (Scott, 2003). Of these, the most common carriers identified were relational systems because respondents generally felt that most renewable energy practitioners had entered the subfield because of the business opportunities it presented. The implication of this is twofold. First, since many of the renewable energy practitioners decided to enter the subfield mainly for pragmatic reasons, their motive for reshaping the field of energy provision might not have been for the common good of society but purely for personal gains (Deephouse and Suchman, 2008). Second, because they might have entered the subfield purely for opportunistic reasons, their level of commitment is likely to have been low (Marcus and Anderson, 2008). Consequently, many of these opportunistic renewable energy practitioners abandoned the field when state incentives were reduced. This may have contributed to delegitimising the renewable energy subfield (Suchman, 1995).

Weak cognitive pillars may have also undermined the regulative and normative pillars of the artefacts which symbolically demonstrated that renewable energy is a viable technology. As this thesis has shown, improvements in the operating standards of some renewable energy technologies had increased their viability. This had been normatively supported by objects meeting conventions such as higher capacity factors[32] (see Chapter 4). On the other hand, the pervasive view that renewable energy systems such as onshore wind turbines were not aesthetically pleasing (also NIMBYS) may have eroded the cultural-cognitive pillar. In a similar vein, the symbolic systems

[32] Capacity factor- The ratio of actual output of a renewable energy system over a period of time *versus* the potential output if it were possible for it to operate at full nameplate capacity.

may not have been cognitively supported. As the findings show, respondents generally believed that most actors had been motivated to reshape the field of energy provision because of legislative pressure and the relative effectiveness of the MCS and RECC as normative institutions. From an institutional theory perspective, the regulative and cultural-cognitive pillars did not adequately support the normative institutions (Scott, 2001), and this may have contributed to the renewable energy subfield only gaining partial legitimacy (Suchman, 1995). This finding is consistent with that of Sine *et al.* (2007), but not previously reported in this empirical setting.

The lack of established patterns within the renewable energy subfield may have limited the carrying capacity of routines. As established by the literature review, immature organisational fields tend to lack established patterns to mimic (Maguire *et al.*, 2004). As they mature, they become more homogenous through the process of structuration (DiMaggio and Powell, 1983; Giddens; 1984). This causes constituent institutions to be more widely diffused and accepted (Maguire *et al.*, 2004). Due to being a relatively new technological field during its formative years, the renewable energy subfield lacked established patterns to mimic, and this may have hampered its institutionalisation (DiMaggio and Powell, 1983), consequently its legitimacy (Suchman. 1995). With the contributions of this thesis in mind, the next section makes some summarising remarks.

6.6 SUMMARISING REMARKS

This chapter has applied institutional entrepreneurship theory to synthesise and discuss the findings in light of the research questions, literature review and theoretical framework. It began by presenting a process model of institutional entrepreneurship in the renewable energy subfield in the UK for the period 1986-2016. The model shows that the process of institutional entrepreneurship had six key features: 1) enabling conditions in the field of energy provision either motivated or demotivated actors to try and change existing institutional arrangements in the field of energy provision; (2) some actors (e.g. the state; renewable energy practitioners; incumbent energy providers; etc.) in the field used (3) interventions strategies such as theorising and lobbying to try and reshape the field of energy provision by institutionalising renewable energy in the UK. In so doing, they engaged in (4) a process of multi-actor institutional entrepreneurship. In order to gain acceptance for themselves and the renewable energy subfield, they used (5) legitimacy building strategies. Although the

strategies were effective to a certain extent, the renewable energy subfield only gained (6) partial legitimacy and partial institutionalisation. The model and the other findings have answered the research questions in the following ways.

Research Question 1 asked: *"How might have institutional entrepreneurs shaped the renewable energy subfield in the UK during the period 1986-2016 and what impact may this have had on the field of energy provision?"* The thesis finds that institutional entrepreneurs had indeed played a major facilitative role in shaping the renewable energy subfield in the UK by either creating or changing the formal (e.g., legislation, regulations, incentive schemes; etc.) and informal institutions (e.g. norms concerning the role and conduct of industry protagonists) in this organisational sphere. In spite of this, the renewable energy subfield only gained partial institutionalisation. Due to being only partially institutionalised, the renewable energy subfield had very little impact on reshaping the field of energy provision in which it is embedded. This might have been because the renewable energy subfield had the main characteristics of being malleable; unorganised and an unstructured. The five likely causes of being partially institutionalised, are: (1) the misalignment of the institutions; (2) its embeddedness; (3) the porosity of its borders; (4) the conformance of renewable energy practitioners; and (5) structuring organisations not becoming institutionalised. Notably, within this subsection, the thesis proposed the idea of a subfield, an organisational sphere that has the following six main characteristics:

1. A subfield is an organisational sub-community[33] embedded within a larger, overarching organisational field.
2. Due to being a "sub-community", a subfield is constrained by the pressures of subordinacy, whereby actors in the subfield are obligated to complying with the rules of the overarching field in which the subfield is embedded.
3. Ontologically, organisational subfields are geographically unbounded, open relational networks, socially constructed by their constituents. In this way, they are constructed around common issues rather than a common market or technology.
4. To become fully institutionalised, a subfield must overcome being constrained by the dominant institutional logic of the overarching organisational field in

[33] Sub-community: A distinct grouping within a community

which it is embedded, if they have two divergent, competing logics (Thornton and Ocasio, 2008).

5. Institutional entrepreneurship in an organisational subfield is likely to be the outcome of multiple actors, negotiating an agreed outcome. This is because actors belonging to the overarching field, and other neighbouring subfields, are likely to try and capitalise on the entrepreneurial opportunities in the subfield.
6. Actors in a subfield are likely to engage in boundary bridging[34] activities. They are likely to engage in these activities because they are exposed to entrepreneurial opportunities in the overarching and other neighbouring fields and subfields.

Another notable finding that was discussed in this subsection was how the misalignment of the institutions within the renewable energy subfield might have contributed to its partial institutionalisation. Here, it was shown that the misalignment of institutions weakened its overall structure because some institutions did not adequately support others, and in some cases, even undermined them. The subsequent subsection discussed the type of institutional entrepreneurship which had shaped the renewable energy subfield. The analysis shows that the institutional entrepreneurs practised a brand of multi-actor institutional entrepreneurship, a process which involved multiple groups of actors working collectively for a negotiated outcome. The next subsection identified and discussed the main institutional entrepreneurs who had practised as institutional entrepreneurs, these being the United Nations; the European Union; the state and its various agencies such as DECC and Ofgem; renewable energy practitioners/grass-root activists and the incumbent energy providers. The final subsection discussed the attributes which distinguished the institutional entrepreneurs from other actors in the field. This was identified as the collective stock of resources, which includes being, resource-rich (in human capital; social capital; financial capital); resilient (because return on renewable energy investments tends to be slow); and the ability to mobilise and motivate others to envision and implement the institutionalisation project.

The fourth section in the chapter synthesised and discussed the findings in relation to the second research question: *"What conditions may have facilitated or hindered the shaping of the renewable energy subfield in the UK during the period*

[34] Boundary bridging: A way of connecting organisations from within the subfield to other fields.

1986-2016?" The thesis shows that three enabling conditions may have either facilitated or hindered the shaping of the renewable energy subfield during the period: (1) field-level conditions; (2) actors' social positions; and (3) institutionalised structural myths. While field-level conditions and actors' social positions have been previously described by other theorists, institutionalised structural myths is a new category being proposed by this thesis. This constraint is being proposed as a new category of enabling conditions because institutionalised structural myths, such as public policy uncertainty, were found to have influenced some actors' decision as to whether or not they should try and change existing institutional arrangements in the field of energy provision in the UK.

The penultimate section of the chapter synthesised and discussed the findings in light of the third research question: "*How might have institutional entrepreneurs gained legitimacy for themselves and their activities and what effect may this have had on the renewable energy subfield gaining legitimacy?"*. Here, the thesis shows that the institutional entrepreneurs used legitimacy building strategies such as proving the viability of renewable energy; being regulated and creating jobs to try and gain acceptance for themselves and their activities. In spite of this, the renewable energy subfield only achieved partial legitimacy. This has the following three main implications: (1) the appropriateness of renewable energy as the main technology for energy provision in the UK is still questionable; (2) a few better alternatives than renewable energy can still be presented; and (3) business-as-usual in the way the UK provides its energy. Given the significance of the findings, the next chapter presents a set of concluding statements about what they mean.

CHAPTER SEVEN

CONCLUSION

7.1 INTRODUCTION

This chapter concludes the thesis by reflecting on the contributions it has made to knowledge and presenting a set of concluding statements based on the synthesis of the findings, analysis and interpretation. The chapter unfolds as follows: Following the introduction, section 7.2 recapitulates what the thesis set out to do, restates the findings and briefly discusses how this relates to previous work in the area. Section 7.3 summarises the more significant contributions this thesis has made to knowledge; practice and policy. Section 7.4 offers recommendations for future research. Section 7.5 identifies the limitations of the study. Section 7.6 closes the chapter by stating the implications of the findings for future research.

7.2 THE ROLE OF INSTITUTIONAL ENTREPRENEURS IN SHAPING THE RENEWABLE ENERGY SUBFIELD IN THE UK DURING THE PERIOD 1986-2016

This thesis set out to investigate what role institutional entrepreneurs may have played in shaping the renewable energy subfield in the UK during the period 1986-2016. This is now an important topic because the renewable energy subfield in the UK has undergone a process of partial institutionalisation over the past three decades or so, and this thesis has shown that institutional entrepreneurs are the main actors behind this practice (DiMaggio, 1988). This is of social significance because the use of fossil fuels for providing the UK's energy is so entrenched, it has become institutionalised (Jepperson, 1991; Meyer and Rowan, 1977). It therefore follows that using renewable energy to supplant such polluting technologies is likely to contribute considerably to the UK meeting its low-carbon goals (DECC, 2009). By employing institutional entrepreneurship theory, this thesis has taken a new approach to contribute to understanding the old problem of unsustainable energy provision in the UK.

To conduct this inquiry, an exploratory literature review was first performed to critique and summarise the body of literature related to the research topic and identify the gaps in knowledge. The four significant gaps identified were:

1. *Researchers had not analysed on the basis of primary data the role institutional entrepreneurs may have played in shaping the renewable energy subfield in the UK.*

2. *Investigation into the enabling conditions which might have served as catalysts for institutional entrepreneurship in the renewable energy subfield in the UK remained largely underexplored.*
3. *Researchers had failed to investigate on the basis of empirical data how some actors might have overcome the constraint of being embedded agents to become institutional entrepreneurs in the renewable energy subfield in the UK.*
4. *The manner in which institutional entrepreneurs might have gained legitimacy in the renewable energy subfield in the UK was previously underexplored.*

To fill those gaps, the following three research questions were formulated:

1. *"How might have institutional entrepreneurs shaped the renewable energy subfield in the UK during the period 1986-2016 and what impact may this have had on the field of energy provision?"*
2. *"What conditions may have facilitated or hindered the shaping of the renewable energy subfield in the UK during the period 1986-2016?"*
3. *"How might have institutional entrepreneurs gained legitimacy for themselves and their activities and what effect may this have had on the renewable energy subfield gaining legitimacy?"*

Having formulated the research questions, it was established by the methodology chapter that an exploratory qualitative approach was appropriate for gathering the rich data needed to understand a complex social problem such as an energy system in transition (Babbie, 2015; Bryman and Bell, 2011). Subsequently, this thesis conducted a qualitative, case study research which combined an empirical element with a secondary component. The empirical segment of the thesis conducted thirty-nine semi-structured interviews, lasting on average one hour long, with a diverse range of stakeholders belonging to the field of energy provision. This was complemented by an analysis of archived public documents (e.g. public policy energy documents; Office for National Statistics data and other credible sources) pertaining to the period 1986-2016. The primary aim of using multiple approaches for data collection was to facilitate triangulation. The data were analysed thematically by pattern matching, with NVivo11 analytical software being used to assist with this. Data interpretation involved using Bloomberg and Volpe's (2008) outline tool to heuristically determine how the findings related to the research questions.

The analysis of the data yielded the following eight main findings:

(1) The renewable energy subfield had mostly been shaped by the institutional changes which had been enacted by the institutional entrepreneurs.

(2) Although institutional changes had taken place in the renewable energy subfield, it had only attained partial institutionalisation.

(3) Five broad categories of actors practised as institutional entrepreneurs during the period: (1) renewable energy practitioners/activists; (2) incumbent energy practitioners; (3) the state and its various departments such as DECC, Ofgem and the Environment Agency (4) the European Union, and (5) the United Nations. These actors practised as institutional entrepreneurs by creating or reconfiguring the institutions which shaped the renewable energy subfield.

(4) The institutions created or reconfigured by the institutional entrepreneurs were misaligned and did not adequately support each other, therefore they had mimimal impact on reshaping the field of energy provision.

(5) The main enabling condition was institutionalised structural myths such as policy certainty/uncertainty.

(6) The six main institutional constraints were: (1) poor energy infrastructure; (2) the poor credibility of the renewable energy subfield; (3) financial constraints; (4) sociological constraints such as the UK being an oil-based economy; (5) prevailing assumptions, myths and beliefs about renewable energy; and (6) environmental degradation

(7) In order to gain legitimacy for themselves and their activities, some actors from the field of energy provision in the UK employed legitimacy building strategies such as creating jobs and being regulated, however, renewable energy and the renewable energy subfield only attained partial legitimacy. This was mainly due to factors such as the state failing in its facilitative role to create the right enabling conditions for the field; trade bodies were poor advocates; and delegitimising factors such as the lack of incentives.

(8) Renewable energy practitioners mainly conformed because they lacked the power and resources to enact institutional change. Generally, renewable energy practitioners inappropriately employed their intervention strategies, consequently most remained afflicted by the paradox of being embedded agents.

The thesis now elaborates upon each finding. As the findings show, during the period 1986-2016 institutional entrepreneurs played a major role in shaping the renewable energy subfield in the UK. This was evidenced by the numerous institutional changes they enacted, largely manifested as changes in formal legislation, regulations and incentive schemes and norms concerning the role and conduct of industry protagonists. Although these institutional changes occurred in the renewable energy subfield, it only attained partial institutionalisation. This conclusion is based on the findings which show that the strength of the renewable energy subfield to create and institutionalise new rules for the provision of energy was moderate; it was a moderately unstable field (Meyer and Rowan, 1977); the adoption of renewable energy was patchy and at no point in time was renewable energy consumed in a taken-for-granted way across the entire UK (Jepperson, 1991). Had the institutional changes enacted during the period garnered the support of central actors, leadership or champions who had the power to legitimise the new institutions, it is likely that the renewable energy subfield would have been fully institutionalised (Jepperson, 1991). By so doing, it is likely that the subfield would have been more stable, subsequently, it would have gained support by agreement, instead of performance and other pragmatic factors (Meyer and Rowan, 1977). Since the renewable energy subfield only attained partial institutionalisation, it was an immature, incomplete organisational field, still undergoing formation. Despite having these characteristics, the findings suggest that some actors had a role in shaping the renewable energy subfield by practising as institutional entrepreneurs (DiMaggio, 1988).

As this thesis has shown, five groups of actors practised as institutional entrepreneurs: United Nations; the European Union; the state and its various agencies such as DECC and Ofgem; renewable energy practitioners/grass-root activists and the incumbent energy providers. Collectively, these groups of actors engaged in a multi-actor brand of institutional entrepreneurship to shape the renewable energy subfield by creating several new institutions or reconfiguring existing ones. In this case, "multi-actor institutional entrepreneurship" involved different institutional entrepreneurs working as collective groups to create or reform the institutions identified in Table 13 (see Chapter 5): the regulative institutions were created or transformed by the state and its agencies, the EU and the UN; the normative institutions were typically created by renewable energy practitioners, the incumbent energy providers and other field actors; and the cultural-cognitive institutions were generally created by civil society and

technocrats. This brand of institutional entrepreneurship did not however simply involve one group of actors imposing its institutions on the others, but rather a case of the different groups of institutional entrepreneurs working and interacting together for an agreed, negotiated outcome.

Although the institutional entrepreneurs shaped the renewable energy subfield considerably, this may have had limited impact on reshaping the field of energy provision because of factors such as the misalignment of the newly created institutions; the heterogeneity of the field of energy provision (e.g. contradictory institutional logics caused the pursuit of divergent goals); agency and power (e.g. the renewable energy practitioners not having the necessary agency to shape the subfield at free will because of the complex economic, political, cultural and other factors). Other factors such as the instability and incoherence of rules regimes; deep-seated cultural values in the UK (e.g. opposition to onshore wind); limited broad-scale commitment to active energy citizenship and the idea of decentralised, locally-led/owned renewable energy generation and use, may have also contributed to the field of energy provision not being reshaped more significantly by the institutional entrepreneurs.

This thesis found that the main existential enabling conditions were institutionalised structural myths such as public policy (un)certainty concerning renewable energy. Institutionalised structural myths either served as triggers or deterrents of institutional entrepreneurship by being entrenched, cultured *"structures"* which motivated or demotivated actors from acting as institutional entrepreneurs. It was also determined that in fulfilling its duty, DECC acted as an institutional entrepreneur by constructing the rule systems for the renewable energy subfield. To spur the growth of the renewable energy subfield, DECC used a number of state subsidies to incentivise the market, but later used disincentives to stymie growth. This might have contributed to the renewable energy subfield attracting some players purely for opportunistic reasons at one stage, and repelling potential entrepreneurs at another. This suggests that in organisational subfields, a balance must be struck between the attractiveness and unattractiveness of field-level conditions.

The findings also indicate that many incumbent energy providers did not aggressively attempt to deinstitutionalise the dominant logic that the UK should provide its energy from fossil fuels as this would have put their business models at risk. Renewable energy practitioners largely conformed to the rules of the field of energy provision in the UK because they lacked the systemic power (Stone, 1980) and

resources to enact institutional change (Hardy and Maguire, 2008; DiMaggio, 1988). In this way, systemic power served as a form of institutional control to regulate behaviour on an ongoing basis and set "the rules of the game" in the field of energy provision (Lawrence, 1999; Holm, 1995). Following the lead of Stone (1980), the analysis of this thesis shows that renewable energy practitioners lacked the systemic power needed to access and control the institutions enacted by officials such as the state (e.g. policies which set the direction for the UK's future energy provision). The findings also suggest that because many of the renewable energy practitioners did not employ their intervention strategies appropriately, they remained embedded agents, and this may have contributed to the renewable energy subfield in the UK being only partially legitimate. Other factors which may have also contributed to the subfield only attaining partial legitimacy were the lack of the right enabling conditions for entrepreneurship; trade bodies being poor advocates; and delegitimising factors such as the poor credibility of this organisational sphere.

In terms of the first research question, the findings of this thesis are broadly consistent with other studies on renewable energy in the UK (e.g. Provance *et al.*, 2011) which show that the renewable energy subfield had evolved considerably between the period 1986 and 2016. This thesis however differs by having applied institutional entrepreneurship theory to show that much of this institutional change was under the enabling role of institutional entrepreneurs. These actors either created, maintained or disrupted institutions to shape the renewable energy subfield (Lawrence and Suddaby, 2006; DiMaggio, 1988). By examining the findings from this theoretical position, this thesis has provided a previously undocumented account of why the renewable energy subfield might not have reshaped the field of energy provision more significantly. This was primarily because of factors such as the misalignment of the institutions created by the institutional entrepreneurs; field-level characteristics of both organisational fields; the heterogeneity of the field of energy provision (e.g. competing institutional logics); vested interests; agenda-setting; agency and power.

The first gap in knowledge, which concerns researchers having not empirically investigated what: "*role institutional entrepreneurs may have played in shaping the renewable energy subfield in the UK*", has been filled by the first finding. This finding established that "*the renewable energy subfield had mostly been shaped by the institutional changes which had been enacted by the institutional entrepreneurs*". This is an important discovery because it provides a new account of how actors' agency had

a defining role in the events and outcomes in the renewable energy subfield in the UK during the period 1986-2016. Previous explanations have tended to be mainly pragmatic by focusing on aspects such as barriers (e.g. DTI, 2005, 2006, 2007; DECC 2009; Sauter and Watson 2007; Watson *et al.* 2006) and other external forces (e.g. Provance *et al.*, 2011).

Regarding the second research question, these findings are generally in line with previous research which shows that institutional entrepreneurship tends to be triggered by enabling conditions. They however differ by providing another potential explanation for how institutional entrepreneurship is triggered. In this regard, this thesis concretises DiMaggio's (1988) claim that cultural-cognitive institutions, such as institutionalised structural myths, can motivate actors to initiate institutional change, thus reintroducing the idea of actors' agency into institutional change. The second gap in knowledge, which relates to a lack of scholarship on "*the enabling conditions which might have served as catalysts for institutional entrepreneurship in the renewable energy subfield in the UK*" has been filled by the second finding. This finding established that the "*main enabling condition was institutionalised structural myths such as policy certainty/uncertainty*". This is an important closure because previous explanations have proposed that field-level conditions (e.g. Greenwood *et al*., 2002; Fligstein, 1997) and actors' social positions (e.g. Battilana *et al*., 2009; Emirbayer, 1997) are the main factors which motivate actors to try and change their existing institutional arrangements in organisational fields (DiMaggio, 1988).

In relation to the final research question, these findings are consistent with previous research which show that the extent of institutionalisation of an organisational entity and its degree of legitimacy are intrinsically linked, and to a certain extent, aligned. They however differ from previous studies on renewable energy in the setting of the UK by showing that had the renewable energy subfield been fully institutionalised, it is likely to have had a higher degree of legitimacy. This is likely to have had the effects of increasing its survivability prospects (DiMaggio and Powell, 1983); enhanced its status (Deephouse and Suchman, 2008); broadened its acceptance (Suchman, 1995; Meyer and Scott, 1983) and made it a more attractive organisational sphere in which to invest (Zimmerman and Zeitz, 2002). The third gap in knowledge which concerns researchers having not empirically determined "*how some actors might have overcome the constraint of being embedded agents to become institutional entrepreneurs in the renewable energy subfield in the UK*", has been filled

by the seventh finding. This finding established that "*generally, renewable energy practitioners inappropriately employed their intervention strategies, consequently most remained afflicted by the paradox of being embedded agents*". Closing this gap sheds new light on why renewable energy practitioners in general had not been able to make a more significant impact on reshaping the field of energy provision in the UK during the period 1986-2016. The final gap in knowledge which concerns a lack of theory on "*the manner in which institutional entrepreneurs might have gained legitimacy in the renewable energy subfield in the UK*", has been filled by the eighth finding. This finding determined that "*institutional entrepreneurs used legitimacy building strategies such as creating jobs and being regulated*" to gain legitimacy in the field (Suchman, 1995). By closing this gap, a new explanation has been provided for the approaches used and can be used, by actors to gain acceptance for themselves and their activities in an organisational field (DiMaggio, 1991). It is clear from these closures that this thesis has made a number of contributions to knowledge, practice and policy, as the next section demonstrates.

7.3 CONTRIBUTIONS OF THIS THESIS

The contributions made by this study on institutional entrepreneurship in the renewable energy subfield in the UK are significant. Not only do they contribute to filling the gaps in knowledge, they also offer timely advice for practice and public policy alike.

1. **Knowledge:**

   In addition to closing the gaps described in the preceding section, this thesis makes four major contributions to knowledge. The first contribution is the idea of an organisational subfield. This thesis has demonstrated that an organisational subfield differs from other organisational entities because it has the following five distinguishable characteristics: (1) a subfield is an organisational sub-community embedded within a larger, overarching organisational field. Due to this locality, a subfield tends to be constrained by subordinacy whereby its occupants generally have to conform with the rules of the overarching field in which it is embedded. (2) Ontologically, organisational subfields are geographically unbounded, open relational networks, socially constructed by their constituents. In this way, they are constructed around common issues, rather than a common market or

technology. (3) To become fully institutionalised, a subfield must overcome being constrained by the dominant institutional logic of the overarching organisational field in which it is embedded, if they have two divergent, competing logics (Thornton and Ocasio, 2008). (4) Institutional entrepreneurship in an organisational subfield is likely to be the outcome of multiple actors, negotiating an agreed outcome. This is because actors belonging to the overarching field, and other neighbouring subfields, are likely to try and capitalise on the entrepreneurial opportunities in the subfield. (5) Actors in a subfield are likely to engage in boundary bridging activities. They are likely to engage in these activities because they are exposed to entrepreneurial opportunities in the overarching and other neighbouring fields and subfields. For example, whereas an emerging field differs from a mature field by being less stable (Maguire *et al*., 2004), a subfield may be either a mature or an emerging field, however, what distinguishes it is its embeddedness. For instance, a subfield differs from an emerging field in that some subfields are emerging organisational fields, while others are mature organisational fields.

This thesis has shown that one of the main implications of being a subfield was the issue of competing institutional logics. Here, it was shown that because the renewable energy subfield was embedded within the overarching field of energy provision, it was constrained by the pressures of subordinacy and exposed to competing logics from other subfields and the overarching field itself. In so doing, this thesis examined how a conflictual relationship, caused by an organisational subfield being embedded within a mature field with contradicting institutional logics, affected the dynamics of institutional change. The findings show that the development of new organisational subfields may be significantly impaired if they are submerged within mature fields with more dominant institutional logics and numerous subfields jostling for dominance by using strategies such as agenda-setting.

The second contribution to knowledge is showing how the misalignment of the institutions created by the institutional entrepreneurs in the renewable energy subfield affected new field development. As this thesis shows, in organisational subfields characterised by having

misaligned institutions, subversive cultural-cognitive institutions cancel out the effect of some regulative and normative ones so that they are less likely to combine. The findings suggest that to minimise this effect, debilitating culture-cognitive institutions must be first deinstitutionalised (Dacin and Dacin, 2008) and then substituted with restorative ones. This is likely to have the effect of the renewable energy subfield being more stable (Meyer and Rowan, 1977) and well-developed (Wooten and Hoffman, 2008).

Enabling conditions are crucial for institutional entrepreneurship because they motivate actors to become institutional entrepreneurs (Battilana *et al*., 2009). This thesis makes a third contribution to knowledge by potentially identifying a new enabling condition, institutionalised structural myths. In this regard, this thesis has shown how institutionalised structural myths motivated some actors to practise as institutional entrepreneurs (DiMaggio, 1988) and in some cases demotivated them. The findings show that although field-level characteristics (Leca *et al.,* 2008; Fligstein, 1997; 2001) and actors' social positions (Garud *et al*., 2002; Rao *et al.,* 2000) served as historical enabling conditions, institutionalised structural myths are existential antecedents for institutional entrepreneurship because they influence actors' cognition. In this way, this thesis supports DiMaggio's (1988) belief that culture and institutions influence actors' cognition and actions, thus elaborating the role of actors' agency in institutional change. This reason supports the conceptual premise that institutionalised structural myths may also serve as enabling conditions.

The fourth contribution to knowledge is demonstrating that there is a third degree of legitimacy- partial legitimacy. Legitimacy is central to institutional entrepreneurship because it reduces uncertainty, enhances survivability and enables an organisational entity to access resources (Markard *et al*., 2016; Deephouse and Suchman, 2008; DiMaggio and Powell, 1983). While some scholars have focused on aspects such as dimensions (e.g. Archibald, 2004); subjects (e.g. Durand and Maguire, 2005); sources (e.g. Suchman, 1995; Meyer and Scott, 1983); antecedents (e.g. Deephouse, 1996) and consequences (Meyer and Rowan, 1977;

Parsons, 1960); there is a lack of theory on the various degrees of legitimacy. Prior to this thesis, two degrees of legitimacy were identified in the literature, complete legitimacy and non-legitimacy. While completely legitimate organisations have the characteristics of being unquestionable and widely accepted (Suchman, 1995; Meyer and Scott, 1983), illegitimate organisations deviate from accepted rules or standards and tend to have low survival rates because many questions can be asked about them and better alternatives presented (DiMaggio and Powell, 1983). This thesis contributes to filling that gap by proposing that partial legitimacy is a third degree of legitimacy that falls between those statuses. The idea of partial legitimacy is an important contribution to knowledge because entities with this status are moderately questionable and moderately substitutable. This has the implication of causing these entities to have reduced competitiveness and survival rates.

2. **Practice**-

Much previous research has investigated the role of renewable energy in enabling low carbon energy provision in the UK, however, none had previously done so through the lens of institutional entrepreneurship. This indicates that prior to this thesis there was a void in knowledge because the renewable energy subfield in the UK is constructed of a diverse range of organisational elements (see Table 13) which have been institutionalised by institutional entrepreneurs (Lawrence and Suddaby, 2006; DiMaggio, 1988; Giddens, 1984). This finding has significant implications for practice because this thesis shows that being institutionalised, or, not institutionalised, affects the diffusion of an organisational element. This suggests that had renewable energy been institutionalised in the UK, it is likely that it would have been more entrenched and widely adopted in a taken-for-granted way (DiMaggio and Powell, 1983). A likely outcome of this is that the technology would have been virtually impossible to annihilate (Christensen, 1997), thus contributing to addressing the longstanding issues of climate change and the high air pollution levels in many UK cities.

The findings of this thesis indicate that the way organisational fields are constructed may affect field development. As determined by the

literature review, organisational fields are central to the process of institutional entrepreneurship because they are the clusters of organisations and occupations whose boundaries, interactions and identities are defined by shared institutional logics (Greenwood and Suddaby, 2006; Greenwood *et al.*, 2002; Scott, 2014). In the discussion chapter, it was established that the renewable energy subfield is socially constructed by its occupants and this caused it to be narrowly conceived in some cases. For example, some purist renewable energy practitioners may not have wished to incorporate actors with interests in fossil fuels into the renewable energy subfield because of their ethical values. From a practical standpoint, this has the implication of vital constituents being excluded from the renewable energy subfield (e.g. prospective financiers with stakes in fossil fuels) and the lack of a shared system of meaning across the field. This may affect field development as the expertise of actors who possess the requisite social skills (Fligstein, 2001) to develop the renewable energy subfield are not being drawn upon and much of the financial resources possessed by the incumbent energy providers remains untapped.

This thesis has shown that potentially the main reasons why full institutionalisation was not achieved were the pursuit of vested interests and agenda-setting by some institutional entrepreneurs. This is understandable because institutional entrepreneurship is about pursuing highly valued self-interests (DiMaggio, 1988), however, if these are subversive, they can be detrimental. This suggests that the role of defining the renewable energy subfield in the UK should be handed to neutral/ independent agents or those with the primary interest of promoting renewable energy. For this reason, this thesis proposed that a brand of "multi-actor institutional entrepreneurship" may be effective in addressing this concern. Following the lead of Freeman (1974), this model might be based on all relevant stakeholders within the renewable energy subfield playing a meaningful role in defining its structure (DiMaggio, 1988). By so doing, it is likely that the morals and values concerning the way the UK provides its energy will be taken into consideration (Scott, 2014). This would be consistent with the institutional environment described by DiMaggio (1991), in which all relevant actors are involved in a

structuration process that involves pulling together for the common good of the field.

Although most renewable energy practitioners aspired to institutionalise renewable energy this thesis shows that several institutional constraints and inertial forces prevented them from doing so. Institutional constraints are significant to the process of institutional entrepreneurship because they restrict the actors' agency in an organisational field (DiMaggio, 1988). Similarly, inertial pressures imposed by dominant players in an organisational field can cause institutional change initiatives to be rejected, denied, repressed, refused or even dismantled (Agocs, 1997). By re-categorising the constraints, this thesis provides practitioners with a codified guideline for targeting these concerns. For example, practitioners may recognise that altering regulative constraints may be beyond their reach, whereas some cognitive ones are not (Scott, 2003). This may have the potential impact of subversive cultural-cognitive myths being targeted for deinstitutionalisation, for example, practitioners eroding the entrenched myth that renewable energy cannot meet baseload demand.

A central question for institutional entrepreneurship is "how can actors change existing institutional arrangements if they are constrained by those same institutions?" (Garud *et al.*, 2007; DiMaggio, 1988). Another contribution of this thesis was identifying one condition in which a few actors (e.g. some wind farm developers in Northern Ireland) who were initially deeply embedded within the renewable energy subfield, decided to deliberately operate along its periphery to seek out new opportunities. This is significant because it shows that this strategy enabled them to escape the constraint of being embedded agents and become institutional entrepreneurs. For example, renewable energy practitioners collaborating with players in the waste industry on waste-for-energy projects. This finding has important implications for practice by showing that as organisational fields mature and entrepreneurial opportunities run scarce, it may be advantageous for practitioners to engage in boundary bridging activities by forming alliances with actors in other fields to capitalise on opportunities in those communities.

This thesis has implications for practice by showing that the type of carriers used to transmit institutional elements affect the ways in which they are interpreted and received. For example, the findings reveal that regulative symbolic systems, such as legislation enacted by the state (e.g. Carbon Tax), have been more effective than some normative institutions (e.g. RECC and MCS). For example, on Friday 21st April 2017, Britain provided all its electricity for twenty-four hours without coal for the first time since the First Industrial Revolution, largely because of the Carbon Tax. This finding underscores the importance of state agencies practising as institutional entrepreneurs because they have the authority to institute the regulative symbolic carriers needed to induce institutional change expediently (Scott, 2003). This finding also suggests that suitably placed practitioners should utilise these types of carriers to enact institutional change because of their proven effectiveness. For example, following the lead of countries such as Germany and France to set hard targets for achieving renewable energy goals.

3. **Public policy**-

This thesis has relevance for policymakers and public policy scholars alike. The findings demonstrate that state energy policies have had a profound impact on the development of the renewable energy subfield in the UK. Put bluntly, national energy policies have the potential to either make or break the renewable energy subfield. This thesis shows that public policies geared towards increasing the penetration of renewable energy in the UK, have had a significant impact on the overall founding rate of renewable energy companies and the types of enterprises founded. Generally, economic explanations predict that the market price of an undifferentiated commodity such as energy will not influence the choice of technology used to produce the product, instead, the most economical option will be chosen to maximise profit (North, 1987). This thesis tells a different story. It has shown that factors such as cultural-cognitive institutions can influence consumers' buying decisions as many buyers are now purchasing renewable energy systems because "it is the right thing to do". This is evidenced by renewable energy practitioners persistently appealing for public relations campaigns to be run to educate the public about renewable

energy and public policies being revised to promote renewable energy. Since public policies can serve as powerful mechanisms to initiate field-level institutional change if they are institutionalised (Sarasini, 2013), it is important that their cognitive elements are fitting enough to generate and sustain cultural change through the creation of shared mindsets (Scott, 2014). Apposite cognitive elements are likely to have the effect of dispelling negative myths and assumptions about renewable energy (Scott, 2003), thus increasing its chance of being sold on its green credentials. Although these bold statements have been made, the following recommendations are offered for future research.

7.4 RECOMMENDATIONS FOR FUTURE RESEARCH

This thesis on the role of institutional entrepreneurs in shaping the renewable energy subfield in the UK during the period 1986-2016 has thrown up a few questions in need of further investigation. The first question concerns the construct of institutional entrepreneurship. As the examination of institutional entrepreneurship in organisational fields grows, it is likely that the practice will come under greater scrutiny. Two aspects of institutional entrepreneurship which this study failed to agree on are: (1) whether it is an ongoing process or a product, and (2) when it does it begin and when does it ends? The findings of this thesis suggest that the practice of institutional entrepreneurship is a dichotomy, insofar as it is both an ongoing process and an outcome of institutional change. This thesis however provides a historical account of institutional entrepreneurship after the practice had occurred, instead of conducting an ethnographic study *per se* to observe the phenomenon as it unfolded. One implication of this is the failure of this thesis to define the temporal and conceptual boundaries of institutional entrepreneurship- where and when does it begin and end? If the debate is to be moved forward, a better understanding needs to be gained of whether institutional entrepreneurship is an ongoing process in which institutions are constantly being shaped and reshaped, or purely the outcome of actions initiated by institutional entrepreneurs to enact institutional change. Further research might therefore explore when institutional entrepreneurship begins and ends, if it does indeed unfold.

To move away from the current actor-centric narrative of institutional entrepreneurship, future researchers need to focus more on the processes actors employ

to enact institutional change and how they deal with any struggles they may face while doing so. This thesis has shown that some actors had "scaled-up" their renewable energy ventures to become institutional entrepreneurs, while others have exercised power to achieve their vested interests. It was however found that only the skilful actors, who first acquired the requisite resources, were able to scale-up their renewable energy projects because of the high capital costs of some renewable energy ventures. Future research should therefore examine the intervention strategies institutional entrepreneurs employ to enact institutional change as this might serve as a template for other practitioners. Given the centrality of this strategy for energy transition in the UK, another question which would benefit practitioners being answered is: "*How can actors acquire the collective stock of skills needed to practise as institutional entrepreneurs?*"

Research is also needed to test if institutionalised structural myths is another category of enabling conditions. As established by this thesis, it is prudent to consider the enabling conditions which facilitate the emergence of institutional entrepreneurship as this allows for a better understanding the phenomenon. It was also determined that two categories of enabling conditions are generally cited in the literature, field-level characteristics and actors' social positions (Battilana *et al.,* 2009). This research however found that in addition to these two categories, some actors were motivated, or demotivated, from acting as institutional entrepreneurs because of entrenched structural myths. Given this, further research is needed to validate or invalidate this proposal.

The inter-relationship between the institutionalisation of an organisational element and its legitimacy remains unfinished business. Further research should therefore investigate this connection. As the findings of this thesis show, the diffusion rate of organisational elements increases as they get closer to complete legitimacy and they are more likely to become fully institutionalised. Diffusion still occurs in fields which have partial legitimacy, but at a slower rate and the organisational form may not become fully institutionalised due to delegitimising institutions (Deephouse and Suchman, 2008). For instance, this thesis has shown that as illegitimate elements such as the belief that renewable energy cannot meet baseload demand became institutionalised, they undermined the legitimacy of the renewable energy subfield. Since this observation was made across a relatively small dataset, it would be prudent to conduct further research to analyse commonality across a larger dataset and see if

this applies to organisational fields in general. Future research should also establish whether partial legitimacy is suitable for inclusion in an appropriate set of scales for measuring legitimacy. Relatedly, one question which future research should aim to answer is: *"How can partially institutionalised subfields gain complete legitimacy and how can/should legitimacy be measured?"* In this particular case, the findings suggest that complete legitimacy may be more achievable if the different categories of institutions are correctly aligned and support each other. For example, cultural-cognitive institutions supporting regulative and normative institutions instead of undermining them; deinstitutionalising subversive institutional logics (e.g. the belief that UK should provide its energy from fossil fuels); making the renewable energy subfield more attractive (e.g. introducing more accurately modelled incentive schemes) and eradicating delegitimising elements from the renewable energy subfield (e.g. improving the credibility of renewable energy practitioners). Although these bold recommendations have been offered, the thesis has a number of limitations.

7.5 LIMITATIONS OF THE THESIS

This thesis has four main limitations. First, the qualitative nature of this research limits its literal generalisation beyond the context of the renewable energy subfield in the UK. This limitation is particularly pertinent since the research topic claims that the findings of this project are applicable to the entire UK setting. Further, a single case study was conducted therefore the findings are not generalisable. To delimit this constraint, participants were recruited from all UK countries. Admittedly, most participants were from England due to resource constraints, consequently, this may have introduced selection bias into the research. It should however be borne in mind that the goal of this study was not generalisability, but to gather the rich data needed to contribute to solving the significant real-world problem of unsustainable energy provision in the UK. Given that institutional entrepreneurship is a sociological construct, some of the findings may be applicable to other social settings.

Second, the empirical data gathered by the thesis had to be collected within a one-year time frame because of time constraint. This may have caused this element of the research to capture snapshot data, instead of more longitudinal views. For example, some of the informants' responses may have been influenced by the situation within the renewable energy subfield at the time of the interviews, given that this period was soon after the subsidy cuts of January 2016. This constraint was delimited by the

longitudinal data collected by the document analysis element of the thesis, as this approach allowed for gathering historical data pertaining to the three decades spanning the period 1986-2016.

Third, the way field constituents constructed the renewable energy subfield may have caused the omission of critical views from this thesis. As established by this thesis, the renewable energy subfield is a subjectively constructed, boundless community, populated by transient occupants. For this reason, the views of all its occupants could not be captured. Consequent to this, participants were selected on the basis of accessibility and the relational linkages between individuals and organisations within the field using snowball sampling (Bryman and Bell, 2011). Since snowball sampling was used in conjunction with purposive sampling, informants typically recommended actors with whom they had relationships, therefore the views of some actors who possess valuable information may have been missed. This may have introduced selection bias into the research and contributed to some important empirical data being excluded from this thesis. Again, the document analysis element of this thesis aimed to delimit this constraint.

The fourth limitation was the lack of a set of universal identification criteria for institutional entrepreneurs. Although a few researchers (e.g. Greenwood *et al.*, 2002) have developed identification criteria templates for their studies, those are not for institutional entrepreneurship research in general. This lack of a universal measurement for institutional entrepreneurs may have caused the introduction of researcher's bias into this thesis. To delimit this constraint, the identification criteria formulated for this research project was devised from the broad range of literature reviewed for this thesis.

Lastly, within this thesis, the present researcher committed to conducting a comprehensive inquiry of institutional entrepreneurship, yet only provided a historical account of the phenomenon was obtained. It would have therefore been beneficial to observe institutional entrepreneurship as it unfolded as this would have facilitated a better understanding of the construct. Due to these shortcomings, the next section sets out the implications for future research.

7.6 IMPLICATIONS FOR FUTURE RESEARCH

Based on the preceding limitations and the findings, future research should address at least the following four issues:

(1) Future studies could follow a different research design. As explained in the methodology chapter, this thesis is a single, qualitative case study that captured the views of participants belonging to the field of energy provision in the UK. Due to being of an exploratory and interpretive nature, this thesis could be extended to search for statistical rather than analytical data. In this regard, it might be useful to conduct a quantitative study that captures the views of participants from other renewable energy subfields, or other subfields in general (e.g. oil and gas subfield; nuclear subfield; etc.). A well-accepted way of doing this would be to conduct a large-scale, population-based survey (comprised of a structured questionnaire) of constituents belonging to other fields and subfield. This will make the findings more generalisable (Bryman and Bell, 2011).

(2) Future research could be conducted in a more longitudinal time horizon. Since this thesis was conducted in a cross-sectional time horizon, it only provides a snapshot of recent events in the renewable energy subfield in the UK. Although the archival element of the study extended that period by providing a historical account of events in the renewable energy subfield over a thirty-year period, like a still photograph, it only captured actors' views over a one year period. As this thesis has shown, actors' cognition and behaviour may be influenced by institutional environments (DiMaggio, 1991), therefore their opinions may have been biased by the situation they were in at the time. To overcome this bias, future research may benefit from being conducted in a longitudinal time horizon because the process of institutional entrepreneurship is a developmental trend that generally unfolds over an extended period of time.

(3) Since the entire process of institutional entrepreneurship may take a relatively long time to unfold, future research could use a different research strategy (Saunders *et al*., 2007). As explained in the methodology chapter, this thesis analysed archival records and conducted a case study to collect its data. It may therefore be beneficial for future research to conduct an ethnographic study as this allows for observing first-hand what is really going on, over an extended period of time. By so doing, such research would be able to provide extensive and in-depth findings (Bryman and Bell, 2011) about the empirical setting. As the findings show, actors who practised as institutional entrepreneurs had distinguishing characteristics such as being charismatic. By being embedded

within the research setting, researchers will be able to recognise these and other important features.

(4) Future research could recruit a more diverse range of participants. As the methodology discloses, most of the interviewees were renewable energy practitioners (see Table 3). The most likely cause of this lop-sided sample is the snowball sampling technique used to recruit participants (Bryman & Bell, 2011). Future research may benefit from using a technique such as systematic sampling (Saunders *et al*., 2012) as this is likely to result in a targeted, representative sample being recruited for the research. For example, deliberately targeting participants from other subfields and sub-communities, such as the oil and gas and the nuclear energy subfields. By so doing, the data is likely to yield more reliable results, thus providing a more accurate account of the role institutional entrepreneurs may have played in shaping the renewable energy subfield in that empirical setting.

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Appendix A

Interview Guide

Demographic questions

1. Can you please tell me your name?
2. You haven't got to answer this question, but if you did it will help me to contextualise your responses. Can you please tell me your age?
3. Okay, thanks for that. Can you please provide me with an overview of how the activities of [name of organisation.] relate to renewable energy (RE)?
4. How is your work associated with that?
5. What motivated you to enter into the RE sector?
6. Can you please tell me about [name of organisation] business model?

Introductory questions- aimed at defining the organisational field of renewable energy

7. What factors do you believe facilitate or hinder the diffusion of renewable energy across the UK?
8. I am trying to define the organisational field for the provision of energy in the UK. Who would say are the active players in the Energy Industry and who are those affected by their activities?
9. Just to clarify who we are talking about during the interview, can you please explain the difference between the incumbent and renewable energy organisations operating in the Energy Industry in the UK?
10. How is the renewable energy sector regulated in the UK?
11. What are the standards and practices with which you must comply when operating in the Industry?

Questions directly related to answering the three research questions

R.Q.1: ***"How might have institutional entrepreneurs shaped the renewable energy subfield in the UK during the period 1986-2016 and what impact may this have had on the field of energy provision?"***

12. How has the Energy Industry in the UK evolved in the past twenty-five years or so under the enabling role of renewable energy suppliers?

13. What established practices or rules concerning the provision of energy have renewable energy providers changed or sought to change?

14. Can you please tell me about the strategies used by renewable energy suppliers when trying to reshape the Energy Industry?

15. Can you please tell me about the renewable energy providers who changed or attempted to bring about those changes?

16. What do you believe motivated them to try and reshape the Energy Industry?

R.Q.2: ***"What conditions may have facilitated or hindered the shaping of the renewable energy subfield in the UK during the period 1986-2016?"***

17. What conditions do you believe make the renewable energy sector an attractive for renewable energy providers to operate in?

18. Can you please tell me about any barriers which might have been put in place by incumbent energy providers to try and prevent renewable energy suppliers from succeeding with their renewable energy ventures in the UK?

19. What strategies have RE practitioners used to try and overcome those barriers?

20. How do renewable energy practitioner typically construct their arguments to convey the virtues of renewable energy to others?

21. How might have renewable energy practitioners influenced others to assist them with their renewable energy projects in the UK?

R.Q.3: ***"How might have institutional entrepreneurs gained legitimacy for themselves and their activities and what effect may this have had on the renewable energy subfield gaining legitimacy?"***

22. How did renewable energy suppliers make their actions seem proper, appropriate or desirable when attempting to reshape the Energy Industry in the UK?

23. What qualities have enabled some renewable energy providers to be more successful that others with their renewable energy ventures when operating in the Energy Industry in the UK?

24. How can renewable energy providers increase their chances of succeeding with their renewable energy ventures in the UK?

3.4 Closing the interview

25. Is there anything that we have not covered which you would like to add?

26. Can you please recommend anyone else who may be suitable for taking part in the research?

27. Is it okay for me to acknowledge your participation and contribution to the research in my final report?

Rationale for Questionnaire Design

The interview guide hatwenty-sevenen questions. The first eleven questions are introducing questions which attempt to put the interviewees at ease (Kvale, 2008) and contextualise the study. Question 1 identifies the interviewee. In addition to relaxing the informant by being a basic question, it also helps to link data to context during the analytical stage of the study. Question 2 asks the interviewees their ages. As with the previous question, it aims to contextualise the informants' responses during the analytical phase of the research by linking context to response. Question 3 is a probing question (McNamara, 2009) that asks the interviewees to explain how the activities of their work organisations relate to renewable energy (RE). Not only does this establish the respondent's suitability for participating in the research, it also helps to build an institutional biography of the interviewee. As established by section 2.2 of the literature review, drafting institutional biographies of research participants helps to provide an understanding of their histories and how this may have influenced them in trying to change their institutional context (Lawrence *et al.*, 2011). Question 4 determines the participants' areas of expertise. This is important, because in addition to contributing to creating the interviewee's institutional biography, it also steers the direction of the interview. For example, if the informant's area of expertise is energy policy, then the interview teases out issues related to that aspect, but pertinent to the research. Question 5 establishes what had motivated the informant to enter into the renewable energy sector. As determined by section 1.1 of the introduction chapter, institutional entrepreneurs are self-interested actors who seek to change or maintain the *status quo* for interests they value highly (DiMaggio, 1988). If the analysis identifies the informant as being an institutional entrepreneur, the response to this question contributes to better understanding the traits of these actors. Question 6 is a direct question (Kvale, 2008) that asks the respondents to explain the business models adopted by their work organisations. As established by section 2.2 of the literature review, business models are types of institutions created by some actors to structure their institutional contexts (Provance *et al.* (2011). The answer to this question therefore contributes to better understanding the relationship between these institutions and the informant's work organisations.

Question 7 solicits the informant's views on what facilitates or hinders the diffusion of renewable energy across the UK. In addition to providing fresh insights on the factors which may have contributed to or hindered field-level institutional change in

the renewable energy subfield in the UK, the responses to this question informs on the power/agency relationship. As established by section 2.2 of the literature, although some actors may wish to change existing institutional arrangements sometimes they are hindered or facilitated in the process because of the degree of power and agency they possess. Question 8 elicits information from the interviewees which is hoped assist in defining the organisational field of energy provision in the UK. As the literature review determined, institutional entrepreneurship occurs in local social orders refer to as organisational fields (DiMaggio and Powell, 1983). For that reasons, organisational analysis should include an examination of the field because of its causal influences and its role in bridging organisational and societal levels. Identifying the field is paramount because it is one of the primary units of observation for the research. Question 9 seeks to distinguish between the renewable energy practitioners and the incumbents. As ascertained by section 2.2 of the literature review, renewable energy practitioners and incumbent energy providers effect the development of formal institutions differently in the empirical settings outside of the UK (Smink *et al.*, 2015). The responses to this question therefore contributes to identifying the actors behind changing or maintaining existing institutional arrangements in the field of energy provision in the UK and also the power/agency relationship. Question 10 seeks to find out how the renewable energy sector is regulated in the UK. As established by the literature review, regulations are types of institutions which regulate action and behaviour within organisational settings (Genus, 2012). By therefore soliciting the informant's views in this regard, it helps to identify these key institutions and the actors behind their enactment, possibly institutional entrepreneurs. Question 11 determines the standards and practices with which the informant must comply when operating in the field of energy provision. As with the previous questions, informants' responses do not only identify these institutions, but also potential institutional entrepreneurs.

Questions 12 to 16 elicit information which contributes to answering Research Question 1. Question 12 gauges the informants' opinions on the most defining moments/achievements in the renewable energy sector in the past thirty years. By so doing, it helps to formulate a timeline of the most significant events in the sector during the period. It also facilitates the charting of one of the main units of observation (events or non-events) which can either be used to analyse the change to determine if it constitutes institutional entrepreneurship or simply point the study towards events which warrant closer scrutiny. The data yielded by this answer also facilitates triangulation

with the information gathered by the other data collection techniques. Question 13 finds out how renewable energy practitioners might have brought about those changes. As established during the review of the literature, institutional entrepreneurship is about dislodging deeply embedded norms; practices and values (Hardy & Maguire, 2008). Given this, this is one of the more important questions because it provides data which inform on the type of entrepreneurial activities which were used by the renewable energy practitioners to achieve this. Question 14 establishes how renewable energy practitioners used their strategies to promote their renewable energy ventures. As pointed out in section 1.7 of the introduction chapter, one of the primary mechanisms used by institutional entrepreneurs to enact institutional change is the use of intervention strategies to deinstitutionalise existing institutional practices and introduce alternatives. The data provided by this question are useful in several respects. For instance, identifying these strategies sheds light on tools used by some actors to change or maintain institutions and thus practise as institutional entrepreneurs. Question 15 is a direct question that aims to identify the institutional entrepreneurs. As emphasised continually throughout this thesis, institutional entrepreneurs are change agents who seek to change or maintain existing institutional arrangements (DiMaggio, 1988). The responses to this question therefore identify one of the key units of analysis for the thesis, the institutional entrepreneur. Question 16 concludes this set of questions by collecting the interviewees' opinions about the motivational factors which may have influenced actors to engage in their renewable energy ventures. By so doing, the answer sheds light on why individuals or organisations might have been interested in undertaking those activities, thus providing a better understanding of why and how actors may be encouraged to enter the sector to operate as renewable energy practitioners, and in some cases, practise as institutional entrepreneurs.

Questions 17 to 21 gather data which contribute to answering the second research question. Question 17 asks a direct question (Kvale, 2008) which determines the key enabling conditions for renewable energy practitioners to succeed in their ventures in the energy industry in the UK. As established by section 2.2 of the literature review, the right enabling conditions are the main triggers of institutional entrepreneurship (Battilana *et al.*, 2009; Child *et al.,* 2007). The answer to this question therefore provides a better understanding of how rules are created to facilitate, support and supplement their endeavours (Lawrence and Suddaby, 2006). Question 18 provokes a discussion about the main barriers preventing the wider diffusion of renewable energy in the UK. As

established in section 2.2 of the literature review, some actors in the field of energy (usually incumbents) construct barriers which prevent new entrants from succeeding in their entrepreneurial activities (Smink *et al.,* 2015). By therefore identifying these barriers and explaining how they hinder the diffusion of renewable energy in the UK, the answer to this question provides data which assist in addressing this problem. Question 19 gauges the informants' perceptions on how the barriers may be overcome. This is paramount, because the answer to this question sheds light on the strategies which may be employed to overcome any inertial influences they may have faced. Question 20 determines how renewable energy practitioners typically construct their arguments to convey the virtues of renewable energy to others. As established by section 1.7 of the introduction chapter, institutional entrepreneurship is largely discursive process (Zilber, 2002). The responses to this questions therefore shed light on the whether renewable energy practitioners are employing this strategy effectively. Question 21 solicits informants' opinions about how some renewable energy practitioners might have influenced others to assist them with their renewable energy ventures in the UK. As section 1.7 of the introduction chapter found out, power is central to DiMaggio's (1988) thesis of institutional entrepreneurship as actors are perceived to draw on this resource to either initiate institutional change or maintain the *status quo.* The data gathered by this question will therefore contribute to informing on any power play which may have existed between actors in the renewable energy sector and the field of energy provision and the effect this may have had on facilitating or hindering institutional change (DiMaggio, 1988).

Questions 22 to 24 generate data which assist in answering Research Question 3. Question 22 is a direct question (Kvale, 2008) that seeks to determine how renewable energy practitioners might have gained legitimacy in the field of energy provision. Gaining legitimacy is central to achieving field-level institutional change because it provides the support and social acceptance for institutions (Suchman, 1995). It is therefore important that renewable energy practitioners promote their projects appropriately in order to gain support for both themselves and their activities (*ibid,* 1995, p.574). Institutional entrepreneurs engage in activities such as framing, collaborating and political tactics to gain legitimacy (Hardy & Maguire, 2008; Maguire *et al.,* 2004; Fligstein, 1997) therefore the answers to this question provide insights on the effectiveness of any legitimacy building strategies they may have employed. Question 23 finds out what qualities may have enabled some renewable energy practitioner to be

more successful than others with their renewable energy ventures. By so doing, the response to this question contributes to identifying some of the special qualities which institutional entrepreneurs possess. Question 24 determines how conditions can be improved across the UK to increase the diffusion of renewable energy. This is an important undertaking because the answer to that question provides data on how institutional entrepreneurs in the renewable energy sector might have created innovative solutions to gain legitimacy during the period under investigation (Walker *et al.*, 2014).

Questions 25 to 27 close the interview. Before closing, Question 25 asks the interviewees if they have anything else to add. In addition to allowing for any points which may have been missed, it maintains the interpretivist position by not assuming that everything has been necessarily covered during the interview. Question 26 asks the interviewee to recommend others for the study. As explained in the methodology chapter, two main approaches were used to recruit participants for the research, snowball sampling and purposive sampling. Asking respondents to recommend others is one of the key strategies employed for recruiting potential participants during snowball sampling (Kvale, 2008). Question 27 closes the interview by thanking the interviewees and asking them if it is okay to acknowledge their participation in the final manuscript. In addition to being courteous, this is good research ethics (Saunders *et al.*, 2009).

Appendix B

Sample Factsheet Information

Interview No: Anonymised

Date and time: 11/02/16. From 14:00-14:40 hrs (40 minutes).

Recruitment and selection: Purposive sampling; informant recruited by email and telephone.

Type of interview: Face-to-face/recorded

Interviewer: Leigh Champagnie

Interviewee: Anonymised

Position: Anonymised

Sex: Male

Address: Anonymised

Age group: 34 years old

Summary of interviewing process:

The interview was conducted at the interviewee's workplace, in a room which had been reserved by the informant. The interview room was specifically designed for such purposes and was located within a larger, open-plan office. I and the interviewee were the only ones present, it was quite and free from intrusion. The interview began precisely at 2PM, as had been mutually agreed six days earlier. The interviewee was very talkative, articulate and possessed considerable knowledge in his area of expertise. He was reasonably smartly dressed, but relatively informal for his position within the organisation. The informant seemed to understand the majority of questions asked, however in a few cases seemed to have taken some out of context.

The interview flowed quite smoothly throughout with very little interruptions. Overall, the informant was very defensive of his employer. One of the most salient conclusions drawn from the interview is that the interviewee's work organisation gives financial viability precedence in decision making concerning its renewable energy ventures, rather than also factoring in environmental effects in those Life Cycle Costings.

Key Observations and Areas for Improvement:

1. Flow of the interviews- be more conversational to facilitate smooth flow.
2. All questions seem to be providing answers which inform on answering the research questions- they appear to have been understood and answered to meet stated aims.

Transcription Conventions

Interviewer	IR
Interviewee	IE
(really)	Words spoken unclear; best guess
( )	Words spoken unclear; inaudible
(( ))	Description provided by transcriber
[	Two speakers' talks overlaps at this point
[-	There is no interval between turns ('latching')
?	Interrogative intonation
(3.0)	Pause timed in seconds
(.)	Small untimed pause
we::ll	Prolonged syllable or sound
why	emphasis or syllable or stressed word
REALLY	word spoken noticeably louder than surrounding words
"yes"	words spoken noticeably softer than surrounding words
<I must go now>	words spoken noticeably faster than surrounding words
heh heh	laugher syllables
fun (n)ny	words spoken laughingly
.hhh	in-breath
hhh.	out-breath
↑	upward rise in intonation
↓	downward fall in intonation

(Source: Adapted from Roulston, 2013).

Appendix C

IE Identification Criteria

Can be identified operating at any of the following three levels as a: personal; community member or both.

Unit of analysis objective rather than subjective to prevent researcher's bias.

Criteria

1. Introduced alternative mode of doing things in the field of energy provision?
2. Stand out from other actors in the field?
3. Cited as exemplar by other interviewees?
4. Owner/developer of major renewable energy venture?
5. Direct role in shaping renewable energy policy?
6. Pioneer or innovator?
7. Major renewable energy player?
8. Significant role in driving renewable energy diffusion?
9. Significant role in stymieing renewable energy diffusion?
10. Possess exceptional qualities/characteristics?
11. Objective proof of having played a major role in shaping the renewable energy subfield?

TABLE 5: Identification Criteria for Institutional Entrepreneurs

Interviewee	Introduced alternative mode of operating?	Stand out from others in the field?	Objective proof of reshaping field?	Cited as exemplar by other interviewees?	Owner/developer of major RE venture?	Direct role in shaping RE policy?	Pioneer or innovator in RE?	Major RE player?	Significant role in driving RE diffusion?	Significant role in stymieing RE diffusion?	Possess exceptional qualities/ characteristics?	Total number of activities and roles

Appendix D

Email response from BEIS

Leigh,
xxxxx passed me your enquiry below.

Data on low carbon employment are currently published by the Office for National Statistics (ONS).
https://www.ons.gov.uk/releases/lowcarbonandrenewableenergyeconomy2014finalestimates

This survey was only started in 2015 – so data for earlier years are not available on a consistent basis. Data for 2015 have been published at an aggregate level with more detail due in April. More details are available on the ONS web site.

Previous studies have been undertaken by TBR and k matrix funded by BEIS amongst others.
https://www.gov.uk/government/publications/low-carbon-economy-size-and-performance
https://www.gov.uk/government/publications/low-carbon-and-environmental-goods-and-services-2011-to-2012

Best regards

Xxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxx
Energy Statistics Team
BEIS, 1 Victoria St, London, SW1H 0ET
✉: xxxxxxxxxxxxx
www.gov.uk/beis | twitter.com/beis_stats

Table 6: Inductive codes developed by examining the data

Category	Inductive codes	Sample quote
Institutional change	Partial institutionalisation	"*I just think it's a shambles, to be honest. The whole thing*." (Consultant/Former employee of renewable energy firm)
Sphere of entrepreneurial activities	Renewable energy subfield	"*We obviously now have relationships with manufacturers, but also competitors, you know it's still quite a small industry in the UK*" (Business Development Manager- Renewable energy firm)
Institutional entrepreneurs	UK Government and departments	"…*the government has tried to retrospectively change the rules*." (Founder/MD- Specialist Solar Developer and Consultancy)
	European Union	"…*we can't continue using coal. Well of course the European Union is taking action on that*…" (Domestic consumer/Founder environmental action group)
	United Nations	."*So for me, the whole sector has changed as a result of the Climate Change Act"* (Founder/Manager- Micro-hydro consultancy)
	Renewable energy practitioners/grassroots activists	"…*a Lightsource or a Bluefield who are really big, that's doing gigawatts*" (Founder/MD- Specialist Solar Developer and Consultancy)
	Incumbent energy providers	"*So you have EDF who does largely nuclear, Scottish Power have an awful lot of renewables because they are focussed on wind*" (Representative of hybrid fossil fuel/renewable energy power plant)

Properties of institutional entrepreneurs	Perseverant/resilient	"It's *not a sexy return, investment in solar isn't sexy especially in the UK, but it is predictable*." (Founder and Managing Director-Major solar energy provider)
	Ability to mobilise others	"*..we were walking around the streets of London knocking on financial institutions doors to try and raise the money*." (Founder and Managing Director-Major solar energy provider)
	Persuasive	"*We typically raise it through crowd-funding, so all our investors are members of the public who join a platform and invest*." (Founder/CEO- Funder of renewable energy ventures)
	Good management skills	"*If they manage their costs and projects well, I think they will be more successful*" (CEO- Wind and solar energy provider)
Enabling conditions	Institutionalised structural myths	"*Policy certainty is the key thing for us*." (UK Country Manager – Multinational hybrid fossil fuel/renewable energy assets developer).
Institutional constraints	Poor energy infrastructure	"*…the grid is old and it has some big problems and it needs to be updated...*" (Founder/MD- Specialist Solar Developer and Consultancy)
	Poor credibility of the renewable energy subfield	"*So he's not being honest (.). They just want the sale*" (Domestic consumer).
	Sociological constraints	"*The economy is based on oil, our economy is based on fossil fuels*" (Domestic consumer/Founder environmental action group).

	Prevailing myths and assumptions about renewable energy	"*I think in the UK you've had a lot of charlatans who got into it purely on the basis of making money, pretending as if they are a green company*." (Independent Energy Consultant/Former employee of renewable energy firm)
	Financial constraints	"*Clearly, people don't like having to pay more for their electricity than they absolutely have to*" (Head of Facilities and Asset Solutions/Former Head of Energy).
	Environmental concerns	"…*Greenpeace, he was passionate about the environment*…" (Domestic consumer/Founder environmental action group)
Intervention strategies employed	Lobbying	"*They can afford to lobby as much as they want, we can't*….." (Founder and Managing Director- Biomass energy provider).
	Creating	"*It is a solar development company which was set up in 2010 by myself and two other partners*." (Founder/MD- Specialist Solar Developer and Consultancy)
	Framing	"*...to try and encourage people to use renewable energy rather than conventional energy*" (Academic).
	Mainstreaming	"*The main strategy is providing up-to-date information*" (CEO- Wind and solar energy provider)
	Educating	"*I think part of the process has been trying to educate end-users*…" (Head of

		Facilities and Asset Solutions/Former Head of Energy)
	Lobbying	"*..so they are lobbied by the oil industry lobbyists*…" (Domestic consumer/Founder environmental action group)
Inertia to change	Poor grid infrastructure (DNOs)	The fact that we are operating in a market where they [DNOs] have a vested interest in the supply of energy, rather than receiving it, is a bit of a dichotomy really." (Head of Facilities and Asset Solutions/Former Head of Energy).
	Lack of state support	"But, I think the main barrier has been policy uncertainty" (UK Country Manager – Multinational hybrid fossil fuel/renewable energy assets developer).
	Barriers by incumbent energy providers	"I guess the incumbents who obviously have vested interests…" (UK Country Manager – Multinational hybrid fossil fuel/renewable energy assets developer).
Overcoming the paradox of embedded agency	Use of innovation	"I think innovation is a big part" (UK Country Manager – Multinational hybrid fossil fuel/renewable energy assets developer).
	Good social skills	""In my case I did it myself, which is important" (Domestic consumer/Founder environmental action group)
	Possess required resources	The only people who can really play that game are large players such as Lightsource" (Founder/MD- Specialist Solar Developer and Consultancy)

Carriers of institutions	Symbolic systems	"*The introduction of the Renewable Energy Obligation [ROCs] was the biggest event in the policy landscape*" (Founder/Manager- Micro-hydro consultancy).
	Relational systems	"*Joining the associations, networking, coming together through those sorts of things*" (Founder/CEO- Funder of renewable energy ventures)
	Routines	"*So the political reason is the Not-In-My-Back-Yard Syndrome* [NIMBSY]" (Representative of hybrid fossil fuel/renewable energy power plant)
	Artefacts	"*So offshore wind is the only renewable which the government holds up"* (Representative of hybrid fossil fuel/renewable energy power plant)
Legitimacy building strategies	Theorising	"*Coal is there at the moment, but after 2025 it won't be*" (Representative of hybrid fossil fuel/renewable energy power plant).
	Viability of renewable energy	"…*illustrates that it is perfectly possible for us to utilise renewables to provide enough generation at all points.*" (Environment Officer)
	Honesty of renewable energy practitioners	"*I think the industry needs to get rid of the cowboys*" (Owner and MD- Solar energy firm).
	Being regulated	*"To be certain that he knows what he is doing, you are going to get a MCS certified installer"* (Assistant Managing Director- Renewable energy consultancy)

Creating jobs	"*I'm making local jobs to wash the solar panels and stuff*" (Founder/MD-Specialist Solar Developer and Consultancy)